CCD-F550E
RMT-502

SERVICE MANUAL



AEP Model
UK Model
Australian Model
E Model

Video 8

U MECHANISM

SPECIFICATIONS

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	PAL colour, CCIR standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 20.051mm/sec. LP: Approx. 10.058mm/sec.
Recording time	SP mode: 1 hour 30 min. (P5-90) LP mode: 3 hours (P5-90)
Playback time	SP mode: 1 hour 30 min. (P5-90) LP mode: 3 hours (P5-90)
Fast forward/rewind time	Approx. 6 min. 30 sec. (P5-90)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 8 x power zoom lens f=8.5 to 68 mm. F 1.6 with macro Filter diameter: 46 mm
Autofocus system	TTL
Colour temperature	AUTO, HOLD (indoor) 3,200 K (outdoor) 5,800 K
Minimum illumination	3 lux
Illumination range	3 lux to 100,000 lux (0.3 to 9294 footcandles)
Recommended illumination	More than 100 lux (9 footcandles)
Aperture correction	Automatic Back light adjustment

Input and output connectors

Video output	(Australian, E Model)/output Phono jack, 1 Vp-p. 75ohms unbalanced sync negative
Audio output	(Australian, E Model)/output Phono jack (2 : L, R), input (Australian, E Model) : −7.5dBs, input impedance more than 47 kilohms Output: −7.5dBs, (at output impedance 47 kilohms) impedance less than 1 kilohm
RFU DC OUT	Special minijack, DC 5 V
Headphone jack	Stereo minijack, 8-ohm impedance
Remote jack	Stereo mini-minijack
MIC jack	Stereo minijack, −66 dBs, low impedance with 2.5 to 3 V DC output, impedance 6.8 kiohms
Microphone power output jack	Special minjack, 5 V DC

— continued on next page —

For MECHANICAL ADJUSTMENTS, refer to the "8mm Video MECHANICAL ADJUSTMENT MANUAL III (U MECHANISM)" (9-972-732-11)

Refer to the SUPPLEMENT-1 for ELECTRICAL ADJUSTMENTS.

MICROFILM

8 VIDEO CAMERA RECORDER

SONY®

General

Power requirements
On battery mounting surface
6.0 V (battery pack)
7.5 V (AC power adaptor)
9.0 V (alkaline batteries)

Power consumption
6.5 W (camera recording)
including the viewfinder

Installation: Vertically, horizontally

Operating temperature
0°C to 40°C

Storage temperature
-20°C to +60°C

Dimensions: Approx. 111 x 139 x 321 mm (w/h/d)

Weight: Approx. 1.2 kg
excluding the battery and cassette

Microphone: Electret condenser microphone, stereo type

Wireless Remote Commander

Remote control system
Infrared control

Command mode: VTR 2

Power requirements
3 V DC, 2 R6 batteries

Dimensions: Approx. 57 × 20 × 120 mm (w/h/d)

Weight: Approx. 62 g
(excluding batteries)

Design and specifications are subject to change without notice.

Note
This appliance conforms with EEC Directive 87/308/ EEC regarding interference suppression.

Supplied accessories

The camcorder is packed with the following units. Check to see that everything is contained in the package. (*Attached to the camcorder.)

- Wireless Remote Commander (1)
- R6 battery for Remote Commander (2)
- Battery pack NP-66 (AEP/UK MODEL) (1)
  NP-66H (E/AUS MODEL) (1)
- AC power adaptor AC-V35 (1)
- Lithium battery CR2025 (1)
- RFU adaptor RFU-90E (AEP MODEL) (1), or
  RFU-89EA (UK/E MODEL) (1)
  With the RFU-89EA, an aerial selector and a screwdriver are supplied.
  RFU-90AS (AUS MODEL) (1)
- Shoulder strap (1)
- Lens cap (1)*

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

Section	Title	Page
1.	**GENERAL**	
	• Warning	4
	• Introduction	4
	• Identifying the Parts	4
	• Connecting the Power Sources	8
	• Using the Best of Battery Pack	10
	• Setting the Date and Time	11
	• Inserting Tapes	12
	• Adjusting the Viewfinder Lens	13
	• Recording a Picture Using Automatic Adjustment	13
	• Selecting the Automatic/Manual Adjustment	16
	• Using the PROGRAM AE Button	17
	• Manual Focusing	18
	• Adjusting the White Balance	19
	• Setting Shutter Speed	20
	• Shooting with Backlighting	21
	• Zooming	21
	• Close-up(Autofocusing in Macro)	22
	• Fade-in and Fade-out	23
	• Recording a Title	23
	• Recording the Age of Your Child	25
	• Connections for Playback	27
	• Playing Back a Tape	28
	• Editing onto Another VTR	30
	• Using the Tape Counter	30
	• Hints for Better Shooting	31
	• Notes and Precautions	32
	• Using Your Camcorder Abroad	33
	• Indications Inside the Viewfinder and Display Window	33
2.	**DISASSEMBLY**	
2-1.	Removal of Cassette Lid (M) Assy	34
2-2.	Removal of VTR Panel (M) Assy	34
2-3.	Removal of Lens Hoop	34
2-4.	Removal of Cabinet (L) Assy	34
2-5.	Removal of Cabinet (R) Assy	35
2-6.	Removal of Microphone (MC-44P Board)	35
2-7.	Removal of EVF Assy	35
2-8.	Removal of Camera Block	36
2-9.	Removal of CCD Imager(CD-20P Board)	36
2-10.	Removal of VA-46P Board	37
2-11.	Removal of SS-100P Board	37
2-12.	Removal of Cassette Compartment Assembly (N)	37
2-13.	Internal Views	38
3.	**DIAGRAMS**	
3-1.	Circuit Boards Location	39
3-2.	Overall Block Diagram	40
3-3.	Camera (1) Block Diagram	44
3-4.	Camera System Control VC-67P Board IC501	49
3-5.	Camera (2) Block Diagram	51
3-6.	Digital Titler Block Diagram	56
3-7.	Video (1) Block Diagram	59
3-8.	Video (2) Block Diagram	64
3-9.	Servo Block Diagram	67
3-10.	System Control Block Diagram	71
3-11.	Servo, System Control System Terminal Function SS-100P Board IC501	75
3-12.	Mode Control System IC Terminal Function Description FU-72P Board IC501	78
3-13.	Audio Block Diagram	80
3-14.	Viewfinder Block Diagram	84
3-15.	Power Block Diagram	86
4.	**PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS**	
4-1.	Frame Schematic Diagram	89
4-2.	Printed Wiring Boards and Schematic Diagrams	92
	• CD-20P and VC-67P Boards	94
	• DT-77P and MX-12P Boards	104
	• AF-54P Board	109
	• CT-21P Board	113
	• MC-44P, SW-121P and VA-46P Boards	121
	• CC-31P, SS-100P, FP-89 and FP-90 Boards	130
	• RP-77 Board	140
	• CK-20P, DK-5P, ED-19P, FU-72P, LI-17P, RM-22P, VK-4P and ZK-1P Boards	141
	• VF-26P and VF-27P Boards	149
4-3.	Semiconductors	151
5.	**EXPLODED VIEWS**	
5-1.	Cabinet (R) and VTR Panel (L) Assemblies	153
5-2.	Cabinet (L) Assembly	154
5-3.	EVF Assembly	155
5-4.	Mechanical Assembly (1)	156
5-5.	Mechanical Assembly (2)	157
5-6.	Mechanical Assembly (3)	158
5-7.	Main Boards Assembly	159
5-8.	Camera Block Assembly	160
6.	**ELECTRICAL PARTS LIST**	162
	HARDWARE LIST	189

SECTION 1
GENERAL

This section is extracted from instraction manual.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

Do not open the cabinet. Refer servicing to qualified personnel only.

Introduction

Overview of the CCD-F550E

The CCD-F550E Video 8 Handycam is a compact colour video camera/recorder (camcorder). You can use it to shoot the pictures you want and play them back on your television set. The camcorder works with 8mm video format cassettes.

Who this Manual is for

This manual is designed for you. You can use this manual to find exactly the information you need, whether you are familiar with video equipment or not.

How the Manual is Organized

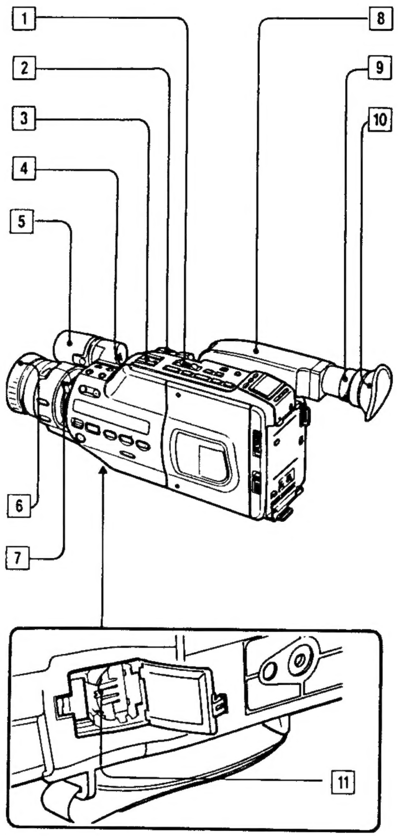
The first section of the manual explains the preliminary steps necessary to prepare for shooting and playing back.

Other sections include shooting procedures that show you how to use the features and functions of your camcorder. If you are a beginner, start with "Recording with automatic adjustments". If you are very familiar with the camcorder, try to shoot your picture with manual adjustments as well as automatic adjustments.
If you want to record right away, see p. 11, 18 through 22.

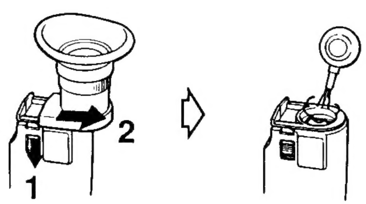
The manual also includes how to play back a picture on a TV and how to edit your original 8mm tape onto another video tape.

If you have any problems during operation, see the "Trouble check" section.

(A-1)



(A-2)



Identifying the Parts

For details on the use of each part, refer to the pages indicated in the circle.

(A-1)

[1] **POWER switch**
CAMERA: for camera recording
PLAYER: for playing back or editing tapes
OFF: power off

[2] **Power zoom button** ㊳ ㊴

[3] **Accessory shoe**
Attach a video light, external microphone, etc. (not supplied).

[4] **Remote control sensor**

[5] **Built-in microphone (stereo)**

[6] **Lens hood/focus ring** ㉜

[7] **Zoom lever** ㉜ ㊳ ㊴

[8] **Viewfinder**
The picture being recorded or played back can be monitored in black and white in here. Also, marks such as caution indicators and function mode appear in here.

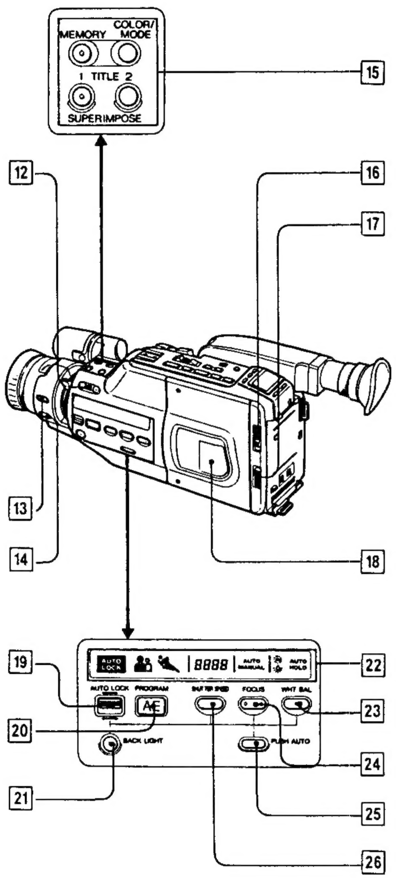
[9] **Viewfinder lens adjustment ring** ㉑

[10] **Eyecup**

[11] **Lithium battery compartment** ⑱

To remove dust from inside the viewfinder (A-2)
Detach the eyecup as illustrated and clean the surface of the screen with a blower.

(A-3)



(A-3)

12 **EDITSEARCH (and ⊜ recording review) buttons ㉔ ㉕ ㉖ ㉗**

13 **FADER button ㊶**

14 **MACRO AF (macro autofocus) button ㊴**

15 **SUPERIMPOSE buttons ㊷ ㊸**
TITLE 1 button
TITLE 2 button
MEMORY button
COLOR/MODE button

16 **EJECT (cassette eject) knob ⑳**

17 **BATT (battery eject) knob ⑫**

18 **Cassette holder**

19 **AUTO LOCK switch ㉒**
When you record with automatic adjustment, set to the green position.

20 **PROGRAM AE (program auto exposure) button ㉙ ㉚**

21 **BACK LIGHT button ㊲**

22 **Display window ㉒ ㉘**

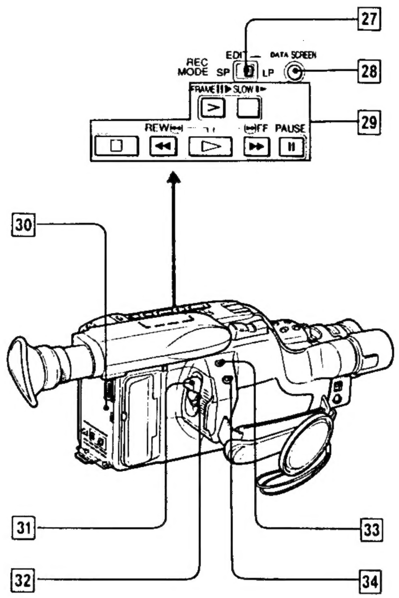
23 **WHT BAL (white balance) button ㉞**

24 **FOCUS button ㉜**

25 **PUSH AUTO button ㉜**

26 **SHUTTER SPEED button ㊱**

(A-4)



(A-4)

27 **REC MODE (recording mode)/EDIT switch ㉒ ㊺**
Switch it depending on the operating mode.

Mode	Recording	Playback	Editing
Setting	SP LP	EDIT	EDIT
Function	Recording mode switch	EDIT switch	

28 **DATA SCREEN button ㊿**

29 **Tape transport buttons ㊿ ㊿**
▷ (playback)
▶▶ (fast forward)
◀◀ (rewind)
□ (stop)
II (pause)
>/II▶ (forward direction/frame-by-frame in forward direction)
I▶ (slow playback)

30 **Battery mounting surface ⑫**

31 **STANDBY switch**
Slide up to set the camcorder to standby mode.

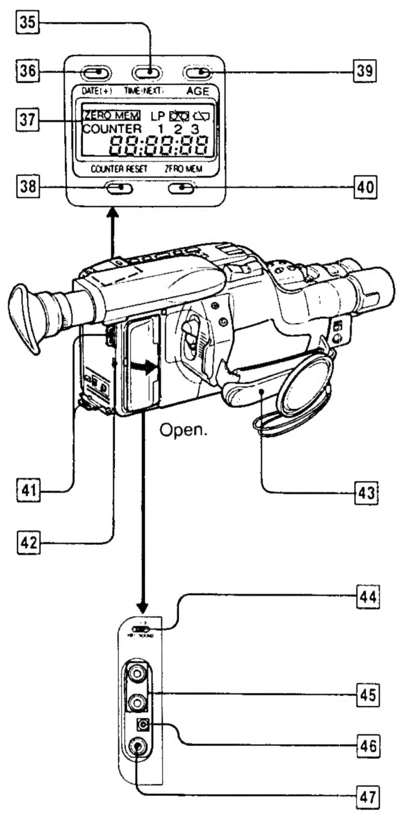
32 **START/STOP button**
Press to start and stop camera recording.

33 **⊄ REMOTE control connector (stereo mini-minijack)**
Connect a wired remote control unit or editing controller, etc. here.

34 **∩ (headphones) jack (stereo minijack)**

About ⊄ (LANC)
⊄ stands for Local Application Control Bus System. The ⊄ connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

(A-5)



(A-5)

35 **TIME (NEXT) button** (19) (24) (46)

36 **DATE (+) button** (19) (24) (46)

37 **Display window**

38 **COUNTER RESET button** (26) (56)

39 **AGE button** (46) (48)

40 **ZERO MEM (memory) button** (26) (56)

41 **Hooks for shoulder strap**

42 **Ⓡ REMOTE COMMANDER ON/OFF switch** (9)

43 **Grip belt**

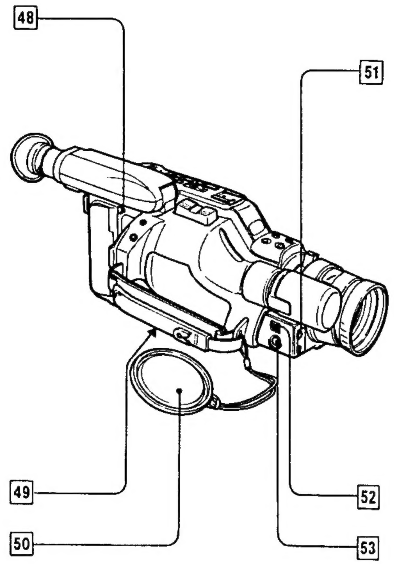
44 **HiFi SOUND selector** (51) (54)

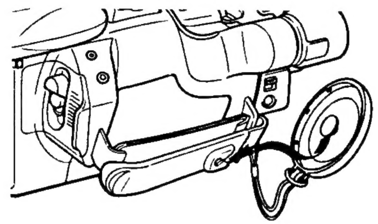
45 **AUDIO L/R output jacks (phono jacks)** (51) (55)

46 **RFU DC OUT (RFU adaptor DC output) jack (special minijack)** (49) (50)
Attach the supplied RFU adaptor here.

47 **VIDEO output jack (phono jack)** (51) (55)

(A-6)





(A-6)

48 **PUSH SLIDE (viewfinder positioning) button** (22)
Use this button to move the viewfinder to the comfortable position to use.

49 **Tripod receptacle (bottom)**

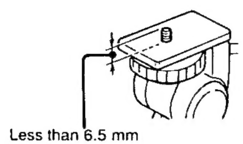
50 **Lens cap**

51 **MIC (microphone) jack (stereo minijack) and DC OUT (power output) jack (mini-minijack)**
Connect an external stereo microphone (not supplied) to record in stereo, or monaural microphone (not supplied). The DC OUT jack supplies power to it.
The MIC jack accepts Sony "plug-in-power" microphone.

52 **BUILT-IN MIC (microphone) switch** (24)
Set to "WIND" when recording in a strong wind.

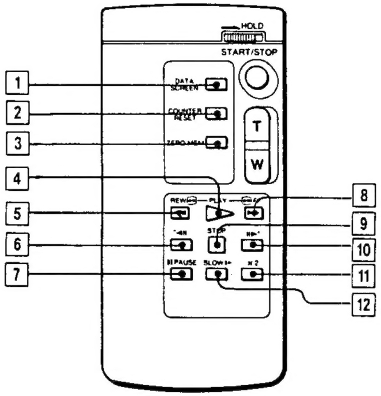
53 **REC (recording) START/STOP button (for low-position recording)**
Use this button instead of the START/STOP button for easier low-position recording.

(A-7)



Note when attaching a tripod not manufactured by Sony (A-7)
When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5 mm.
Otherwise the screw may damage the inner parts of the camera.

(A-8)



Wireless Remote Commander

You can record or play back a tape from a distance.
The buttons on the Commander with the same name or mark as those on the camcorder have the same function.

When you use the Commander
Be sure to set the ⓡ REMOTE COMMANDER ON/OFF switch on the camcorder to "ON", and then start operation of the camcorder, with the Commander pointing towards the remote sensor. (See page 10.)

(A-8)

Note
The * indicates the functions which are operable only with the Commander.

[1] **DATA SCREEN button**

[2] **COUNTER RESET button**

[3] **ZERO MEM (memory) button**

[4] **▷ PLAY (playback) button (52)**

[5] **◀◀ REW (rewind) button (52)**

[6] **< /◀II (reverse direction/reverse frame) button* (53)**

[7] **II PAUSE button (53)**

[8] **▶▶ FF (fast forward) button (52)**

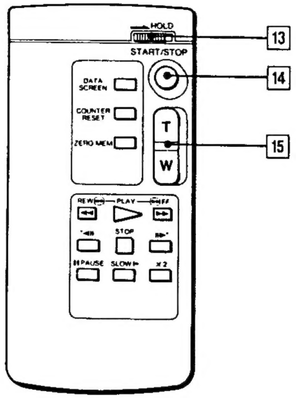
[9] **□ STOP button (52)**

[10] **> /II▶ (forward direction/forward frame) button (53)**

[11] **x 2 (double speed playback) button* (53)**

[12] **SLOW ## (slow playback) button (53)**

(A-9)



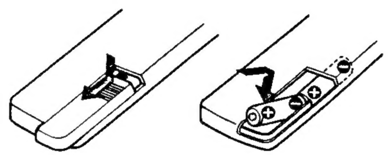
(A-9)

[13] **HOLD switch**
Slide in the direction of the arrow to prevent the buttons from being accidentally pressed.

[14] **START/STOP button**
Press to start and stop camera recording.

[15] **Power zoom button**

(A-10)

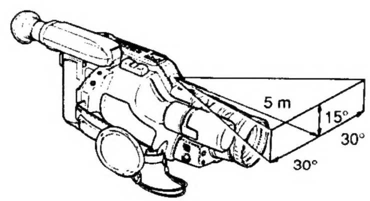


Installing batteries
(A-10)
Insert two R6 batteries with correct polarity.

Battery life
In normal operation, batteries will last up to half a year. If the unit does not operate properly, the batteries might be exhausted. Replace both with new ones.

To avoid damage from possible battery leakage
Remove the batteries when the Commander will not be used for a long time.

(A-11)

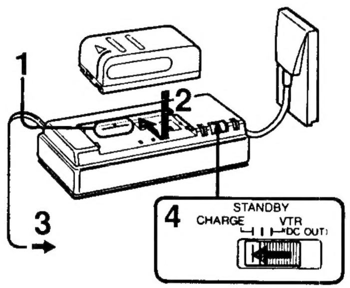


Operating range
(A-11)
Point the Commander to the remote sensor. The Commander can be used within the range as illustrated.

Notes on the Remote Commander
- Keep the remote sensor away from the strong light source such as direct sunlight or illumination. Remote control with the Commander may not be effective.
- Be sure that there is no obstacle between the remote sensor and Commander.
- The command mode of the Commander is VTR2. Avoid to use the Sony VTRs with the same command mode at the same time.

—8—

(B-1)



Preparing your camcorder

Connecting the Power Sources

First, Choose the Power Source

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-66 (supplied), NP-66H, NP-77H, NP-77 or NP-55
	Alkaline batteries	Battery case EBP-55 or EBP-77
Indoors	House current	AC power adaptor AC-V35 (supplied), AC-V30 or AC-V55
In the car	12 V or 24 V car battery	DC pack DCP-55, or AC power adaptor AC-V55 and car battery cord DCC-16AE

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. In this case, supply the power again immediately.

Using the Battery Pack

Step 1

Charge the battery pack. (B-1)

1 **Align the right side of the battery pack with the line on the AC power adaptor.**

2 **Slide in the battery pack in the direction of the arrow.**

3 **Connect the AC power adaptor to a wall outlet.**

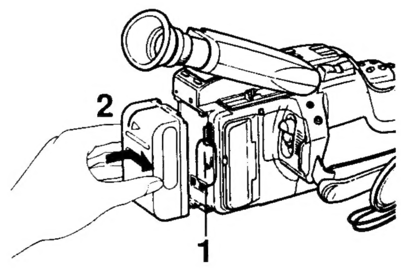
4 **Set the CHARGE/VTR selector to CHARGE.**

	NP-66 (Supplied)	NP-66H	NP-77H	NP-77	NP-55
Required charging time	80	100	140	120	60

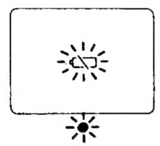
(approx. minutes using AC-V35)

See the instruction manual of the AC power adaptor for details.

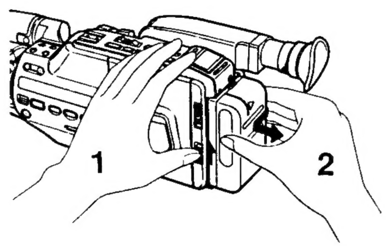
(B-2)



(B-3)



(B-4)



Step 2

Mount the battery pack on the camcorder. (B-2)

1 **Align the right side of the battery pack with the line on the camcorder.**

2 **Slide in the battery pack to the right.**
Note: Make sure the battery fits completely on the mounting surface of the camcorder. Imperfect fit may damage the projections on the camcorder.

Battery life
A fully charged battery pack lasts for:

NP-66 (Supplied)	NP-66H	NP-77H	NP-77	NP-55
65	75	105	85	45

(approx. minutes, continuous recording when used indoors)

When the battery becomes weak, the ⊂⊐ indication and red lamp blink in the viewfinder. (B-3)
Replace the battery pack with a fully charged one.

To remove the battery pack (B-4)
Slide BATT up, and at the same time, slide out the battery pack to the left.

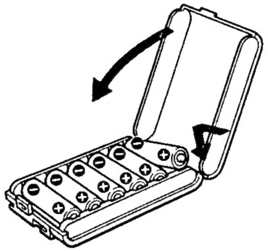
Other options for charging
- AC-V55 AC power adaptor:
  You can charge two battery packs continuously.
- DC-V30 car battery charger:
  You can charge a battery pack by connecting the car battery charger to the cigarette lighter socket.

If you have an NP-4000
You can use it for long outdoor recording.
The DCP-55 DC pack is required for the connection (not supplied).

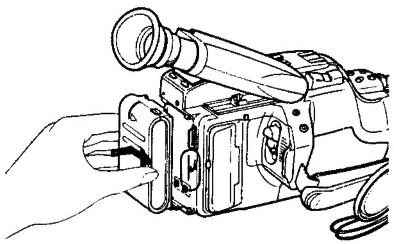
-6-

(B-5)

1



2



Using Alkaline Batteries

(B-5)
The EBP-55 or EBP-77 battery case is required (not supplied).

1 Insert the R6 alkaline batteries into the battery case.
(6 batteries for EBP-55 and 12 batteries for EBP-77)

2 Attach the case in the same way as the battery pack.

Battery life

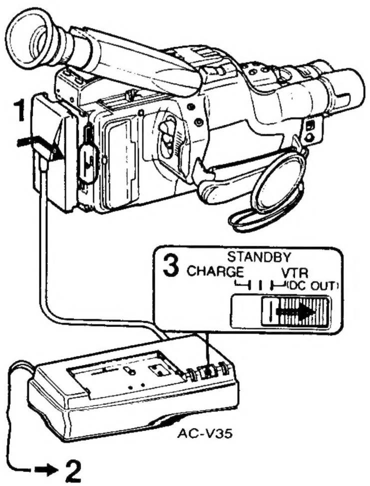
EBP-55	EBP-77
40	105

(approx. minutes, continuous recording when used indoors)

To remove the battery case
Proceed in the same way as the battery pack.
See page 12.

Notes on battery life
- Batteries will not last as long in cold places.
- No indication appears in the viewfinder to warn of a weak battery.

(B-6)



Using House Current

(B-6)
The supplied AC-V35 AC power adaptor is required.

1 Align the right side of the connecting plate with the line on the camcorder, and slide it in to the right.

2 Connect the AC power adaptor to a wall outlet.

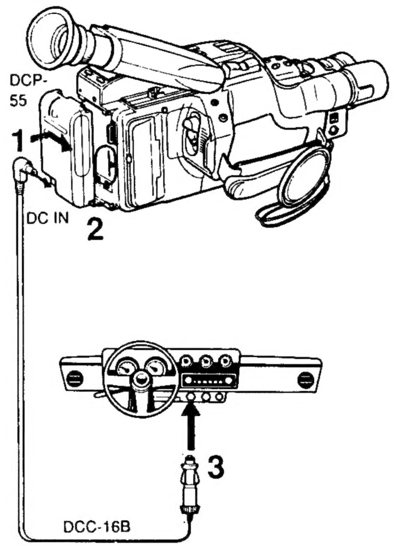
3 Set the CHARGE/VTR selector of the AC power adaptor to VTR (DC OUT).

See the instruction manual of the AC power adaptor for details.

To remove the connecting plate
Proceed in the same way as the battery pack.
See page 12.

Other option
The AC-V55 AC power adaptor can also be used.

(B-7)



Using Car Battery

(B-7)
The DCP-55 DC pack is required (not supplied).

1 Insert the DCC-16B car battery cord supplied with the DCP-55 DC pack into the DC IN jack on the DC pack.

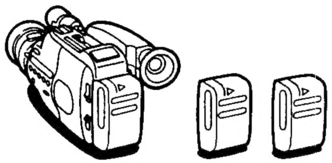
2 Align the right side of the DC pack with the line on the camcorder, and slide it in to the right.

3 Connect the DCC-16B car battery cord to the cigarette lighter socket of a car (12 V or 24 V).

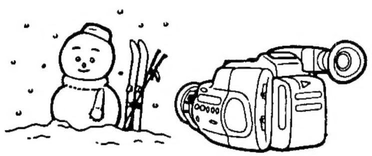
To remove the DC pack
Proceed in the same way as the battery pack.
See page 12.

Other options
The AC-V55 AC power adaptor and the DCC-16AE car battery cord can also be used to operate this camcorder on a 12 V or 24 V car battery.

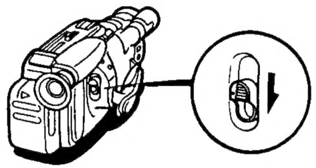
(C-1)



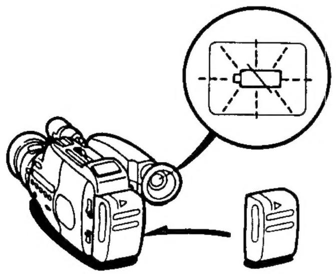
(C-2)



(C-3)



(C-4)



Using the Best of Battery Pack

How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording than you have planned. (C-1)
"Battery life" as indicated in the instruction manual or catalogue of the camcorder is measured by the continuous recording time of the camcorder, placed at a room temperature using a full-charged battery.

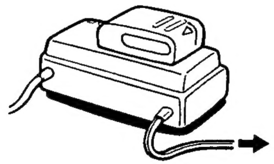
Battery life is shorter in a cold climate. (C-2)
Battery efficiency is decreased and the battery will be used up more quickly.

Turn the STANDBY switch of the camcorder off when not recording to save battery power. A smooth recording can be made even if recording is stopped and started again. (C-3)
While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

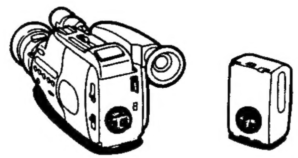
When the Rechargeable Battery Pack should be Replaced

When the ⊏⊐ mark in the viewfinder changes from slow blinking to rapid blinking while you are recording. (C-4)
Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth recording after the battery pack is replaced.

(C-5)



(C-6)



Notes on Charging

Before using the battery pack, charge it sufficiently. A brand new battery pack is not charged.

Recharge the battery pack only when it is exhausted. (C-5)

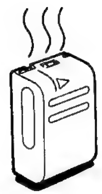
- If recording is completed before the ⊏⊐ mark appears in the viewfinder, it is recommended that you remove the tape, set POWER to CAMERA, slide up STANDBY, and leave the camcorder until the ⊏⊐ mark blinks rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity. However, **the original battery capacity can be recovered if you fully discharge and charge the battery again.**

Recharge the battery pack before using.
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged.
Charge it again but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Keep the Terminals Clean

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. (C-6)
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition.
Also, wipe the + and – terminals with a soft cloth or paper.

(C-7)



(C-8)



Notes on the Rechargeable Battery Pack

Why the battery pack heats up (C-7)
During charging or recording, the battery pack heats up. This means energy has been generated and chemical change has occurred inside the battery pack and this is not dangerous.

How to care for the battery pack

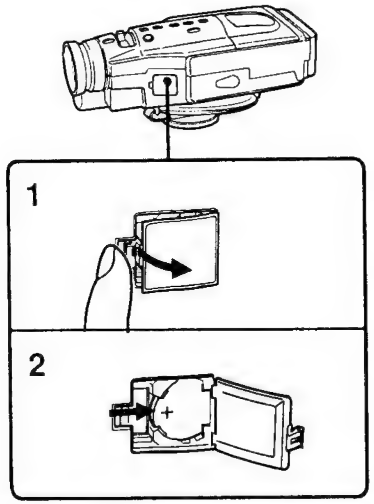
- Remove the battery pack from the camcorder after using it, and keep it in a cool place. When the battery pack is in the camcorder, a small amount of current flows to the camcorder even if the POWER switch is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended you charge the battery before using.

How to use the switch on the battery pack (C-8)
This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.

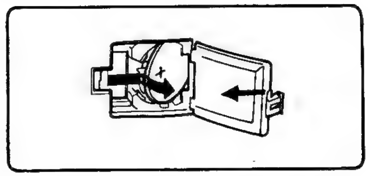
How many times can the battery pack be recharged
It can be fully charged and discharged about 500 times under normal temperatures.
If the ⊏⊐ mark blinks rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Temperatures during charging
Lower temperatures require a longer charging time. Charging under temperatures ranging from 10°C to 30°C is recommended.

(D-1)



(D-2)



Setting the Date and Time

Inserting the Lithium Battery

(D-1)
This camcorder uses a lithium battery to activate the clock and to keep titles and birth dates in memory. Before operating it for the first time, install the supplied lithium battery.

Attach the power source before installing the lithium battery.

1. **Open the cover of the lithium battery compartment on the bottom.**
2. **Install the supplied CR2025 lithium battery with the + side facing out.**
3. **Close the cover.**

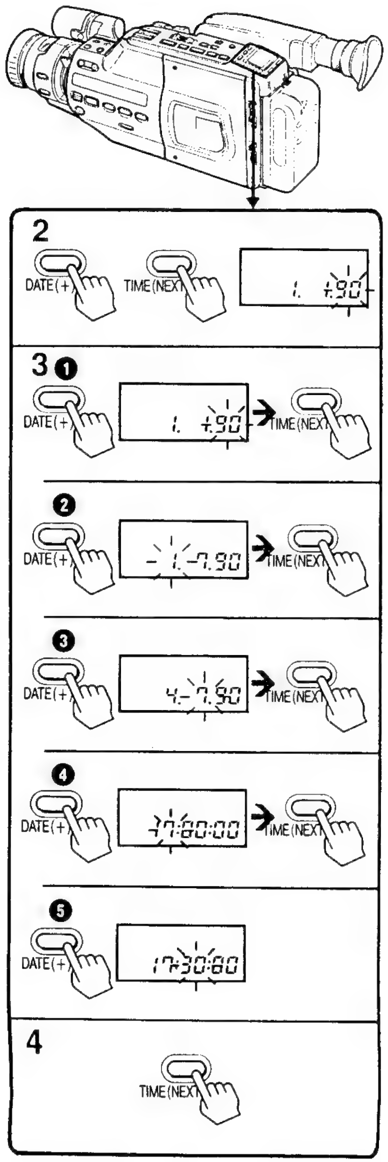
To remove the lithium battery (D-2)
Press the side of the battery in the direction as indicated for installation.

Note on lithium battery life
The battery will last for approximately 1 year in normal operation.
When the lithium battery becomes weak, the time indication will blink on the viewfinder screen for about 5 seconds (when POWER is set to CAMERA). In this case, **replace the battery with a Sony CR2025.**
After replacing the battery, readjust the date, time and titles, birth dates. (If the battery is replaced while the battery pack is attached, the readjustments are not necessary.)

Cautions

- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- Battery may explode if mistreated.
  Do not recharge, disassemble or dispose of it in fire.

(D-3)



Setting the Date and Time

(D-3)

1 **Make sure that a power source is connected, set POWER to CAMERA, and slide STANDBY up.**

2 **Press DATE and TIME simultaneously for more than 3 seconds until the date indication appears in the display window.**
DATE now functions as + (to advance numbers) and TIME functions as NEXT (to execute).

3 **Adjust the year, month, day, hour and minute, in that order.**
First adjust the blinking digits with +, and then press NEXT.
The year starts from 1990 and proceed as follows.
90 (1990) → 91 → ----- → 00 (2000)
↑ ↓
└20 (2020) ← --------- ← 01 (2001)

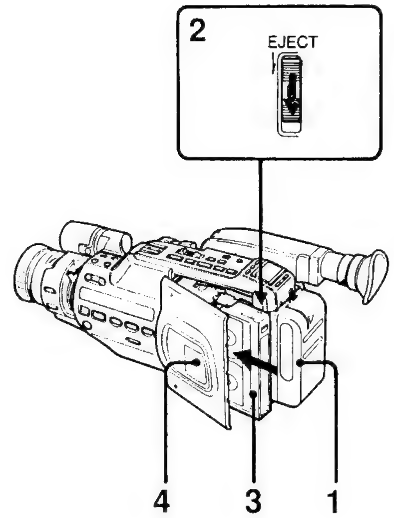
4 **Press NEXT to set the second to "00".**
The clock starts operating.

To correct date and time setting
Repeat steps 2 to 4.

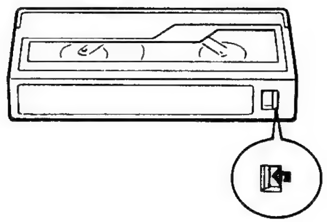
To advance the digits faster
Keep + pressed.

To check the preset date and time
Press DATE or TIME. When you press the same button again, the indication goes off.

(E-1)



(E-2)



Inserting Tapes

Inserting a Tape

(E-1)

1 **Make sure a power source is connected.**

2 **While pressing the small button, slide EJECT.**

3 **Insert a tape with the window facing outside.**

4 **Press the PUSH mark to close the cassette holder.**

Ejecting the Tape

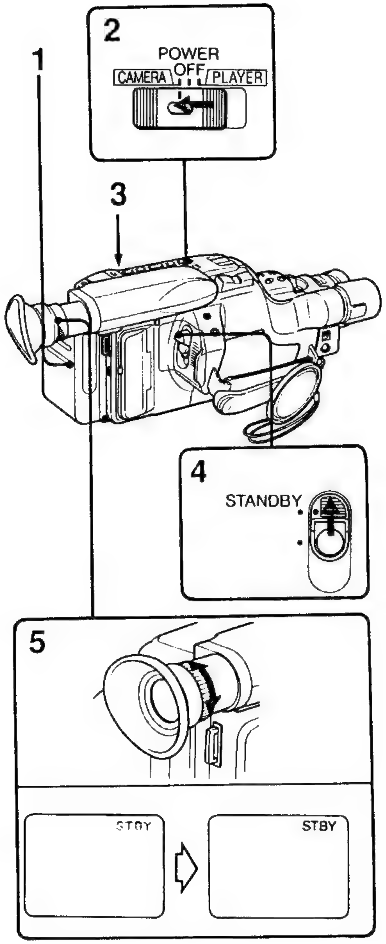
1 Make sure that a power source is connected.
2 While pressing the small button, slide EJECT.
3 Take out the tape and press the PUSH mark to close the cassette holder.

Preventing Accidental Erasure

(E-2)
Slide out the red tab on the cassette to prevent recording.
To re-record on this tape, slide the tab back in.

Notes on handling tapes
- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the type and thickness of tape, or if the tab is out or in, etc.
- Store tapes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

(F)



Adjusting the Viewfinder Lens

The position of the viewfinder lens for optimum vision varies depending on the person. Adjust when using for the first time, or when using after someone else. (F)

1 **Make sure a power source is connected.**

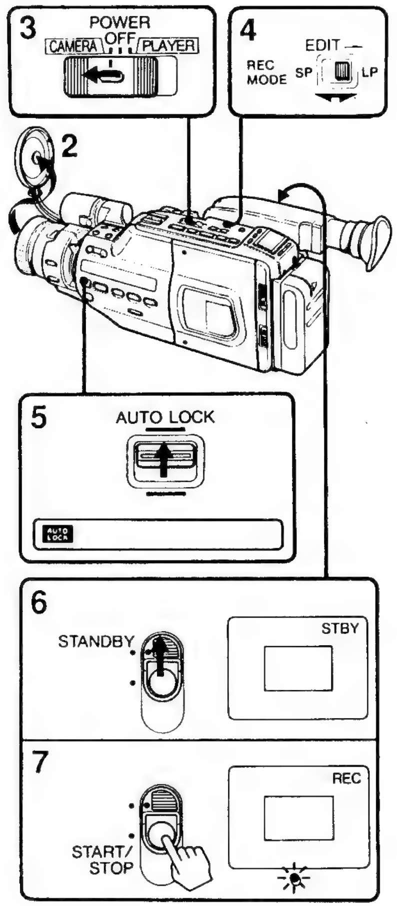
2 **While pressing the green button, set POWER to CAMERA.**

3 **Insert a tape.**

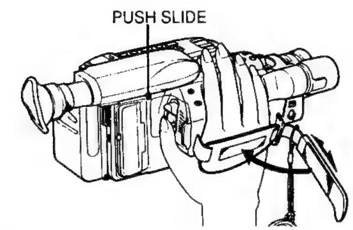
4 **Slide STANDBY up.**

5 **Turn the viewfinder lens adjustment ring so that the "STBY" displayed in the viewfinder screen comes into sharp focus.**

(G-1)



(G-2)



Recording a Picture Using Automatic Adjustments

Caution
Before recording "once-only" events, we strongly recommend making a trial recording and checking that everything is working perfectly.

Start Recording

(G-1)

1 **Hold the camcorder as in the figure. (G-2)**
(Put your hand through the grip belt and make sure that your finger can easily touch START/STOP.)
If your nose touches the camcorder, press PUSH SLIDE to adjust the position and angle of the viewfinder.

2 **Remove the lens cap and attach it to the grip belt.**

3 **While pressing the green button, set POWER to CAMERA.**

4 **Set REC MODE to LP (long play) or SP (standard play), according to the length of your planned recording.**

5 **Set AUTO LOCK to the green position.**
AUTO LOCK appears in the display window.

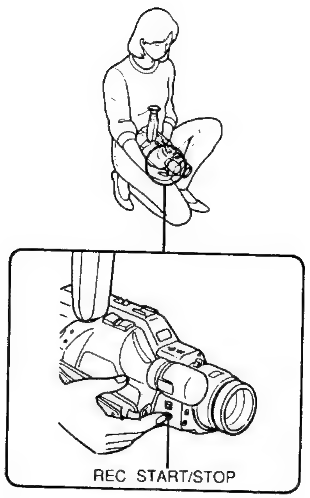
6 **Slide STANDBY up.**
"STBY" appears in the viewfinder. The camcorder is now in standby mode.
Focus is adjusted automatically. Do not turn or stop the focus ring forcibly.

7 **Press START/STOP.**
"REC" appears in the viewfinder. The camcorder is now recording.

To stop momentarily
Press START/STOP again.
"STBY" appears in the viewfinder. The camcorder is in standby mode again.

To stop
Slide STANDBY down and set POWER to OFF.

(G-3)



For low-position recording (G-3)

The viewfinder can be turned 90 degrees up.
Press the REC START/STOP button in front of the camcorder.
To stop recording, press it again.

Notes on recording

- To record from the beginning of the tape, run the beginning of the tape for about 15 seconds before recording. This will avoid missing the starting point when the tape is played back.
- If POWER is moved during recording, the tape will stop.
- When moving from indoors to outdoors, or vice versa, slide STANDBY up and point the camcorder at a white object for about 10 seconds so that the white balance is properly adjusted.

Note on standby mode

If you leave the camcorder in standby mode for 5 minutes or more, the camcorder will be automatically turned off. To resume standby mode, slide STANDBY down once and slide it up again. To start recording, press START/STOP directly.

Note on light sources

If you are shooting a subject in bright conditions just after shooting in a dark place, the picture may not appear in the viewfinder. In this case, point the camcorder to the other direction.

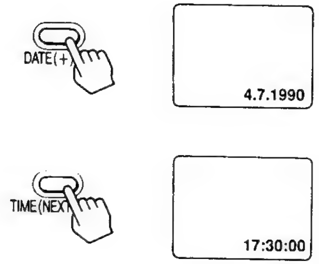
Recording mode

8 mm video format cassette records in the SP (standard play) mode and in the LP (long play) mode and can play back in the SP mode and LP mode.
The quality of the playback picture in the LP mode, however, will not be as good as that in the SP mode.

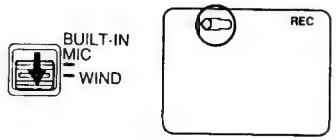
Notes on PCM recording and playback

PCM recording or playback is not possible with this unit.
The PCM sound recorded or after-recorded with another video recorder cannot be played back with this unit.

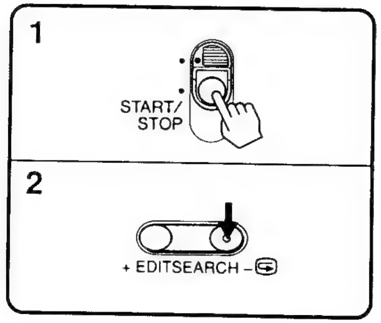
(G-4)



(G-5)



(G-6)



Recording the Date or Time

(G-4)

During camera recording or when in standby mode, press DATE for date indication or TIME for time indication.
The date or time displayed in the viewfinder is recorded with the picture.

To stop recording date or time
Press DATE or TIME again.
The picture recording continues.

When there is a Strong Wind

(G-5)
Set BUILT-IN MIC to WIND. The effects of noise from the wind will be reduced.
After recording, return it to the green position.

To Check the Last Portion of the Previous Recording

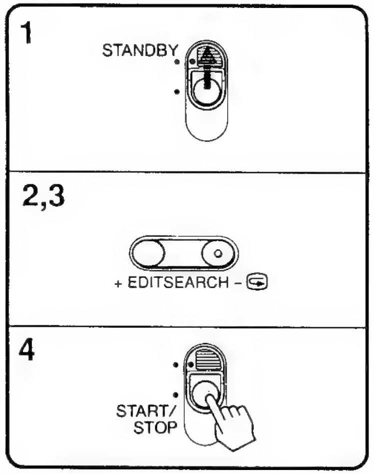
(G-6)

1 Set the camcorder in standby mode by pressing the START/STOP button.

2 Press the – ⊜ side of EDITSEARCH momentarily.
The last few seconds of the recorded portion are rewound and then the recorded picture appears in the viewfinder. After a few seconds of playback, the camcorder goes back to standby mode.

If the picture has not been recorded
The video heads may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette or equivalent.

(G-7)



To Re-record a Previously Recorded Portion

(G-7)

1 Slide STANDBY up.

2 Look in the viewfinder and find the point from where you want to begin the recording by:
Keep pressing the **+** side of EDITSEARCH to advance the picture at a normal playback speed, or the **–** side to reverse the picture.

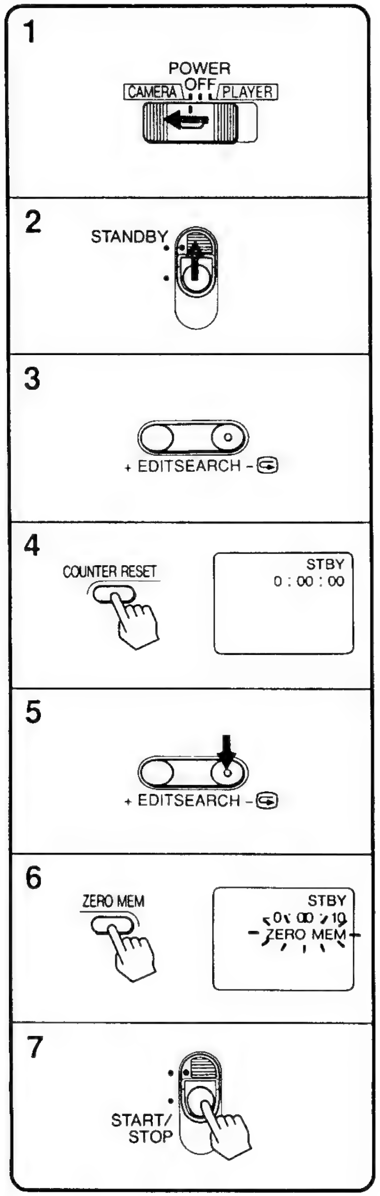
3 At the desired point, release EDITSEARCH.

4 Press START/STOP to start recording.

The picture is connected smoothly after the pre-recorded portion even if STANDBY is slid down and slid up, or even if the power is turned off and on again, provided that the tape is not removed.

To stop
Slide STANDBY down.

(G-8)



To Re-record a Picture in the Middle of a Recorded Tape (Insert Recording)

(G-8)

1 While pressing the green button, set POWER to CAMERA.

2 Slide STANDBY up to set the camcorder to standby mode.

3 While looking in the viewfinder, keep pressing the + or – side of EDITSEARCH and release the button where you want to end the insertion.
The camcorder is set to standby mode.

4 Press COUNTER RESET.
The counter is reset to zero.

5 While looking in the viewfinder, keep pressing the – side of EDITSEARCH and release the button at the point where you want to start the insertion.

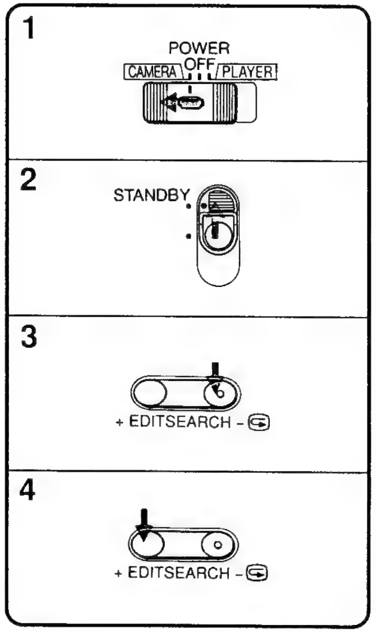
6 Press ZERO MEM.
The insert ending point is stored in memory.

7 Press START/STOP.
Insert recording begins. The insert recording stops automatically near the counter zero point.

To cancel the ZERO MEM.
Press ZERO MEM.

Note
The picture may be distorted at the ending point when played back.

(G-9)



Playing Back your Picture Instantly

(G-9)
You can check the recorded picture in the viewfinder. Sound is not heard.

1 While pressing the green button, set POWER to CAMERA.

2 Slide STANDBY up.

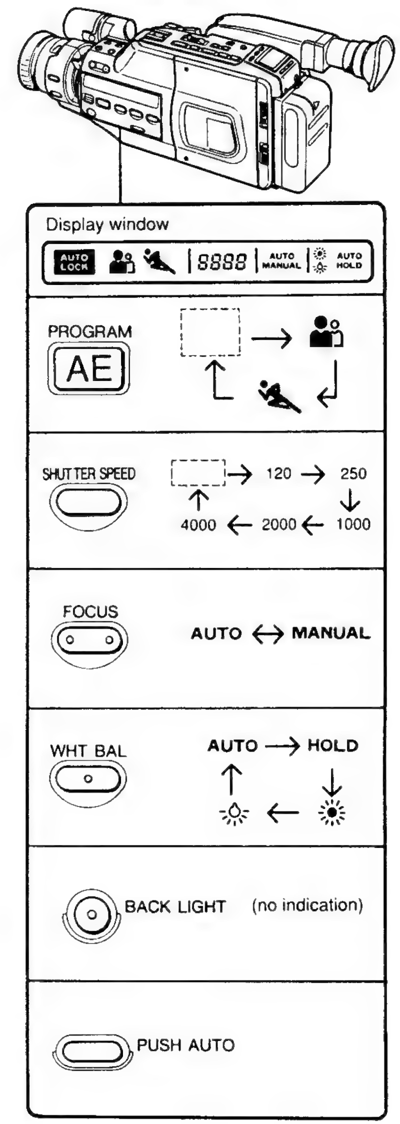
3 Keep pressing the – side of EDITSEARCH to view the playback picture in reverse.

4 Keep pressing the + side of EDITSEARCH to view the playback picture.

To stop the playback, release EDITSEARCH.

To monitor the sound while viewing the playback picture in the viewfinder
Connect a headphone to the ∩ jack.
1 While pressing the green button, set POWER to PLAYER.
2 Press ◀◀ to rewind the tape and press □ where you want to stop.
3 Press ▷ to start playback.

(H)



Selecting the Automatic/ Manual Adjustment

When you set AUTO LOCK to the green position, the white balance, focus and back light are adjusted automatically and the shutter speed is set to 1/50. The automatic function offers you worry-free operation under most shooting conditions. But under certain circumstances, manual adjustment is better for effective recording. For manual adjustment, set AUTO LOCK to the lower position and select an appropriate setting.

Looking over each item (H)
Indications in the illustration show those of the display window.
Indications in the viewfinder change as follows.

Program AE:
No indication → 👥 → ⛷

Shutter Speed:
No indication (1/50) → 120 → 250 → 1000
4000 ← 2000 ←

Focus:
Autofocus frame (auto) ↔ No indication (manual)

White Balance:
No indication (auto) → HOLD → ☀ → ☼

Back Light:
No indication (auto) ↔ ▣

Push Auto:
During recording with manual focusing, as long as you keep the PUSH AUTO button pressed, autofocusing is activated.

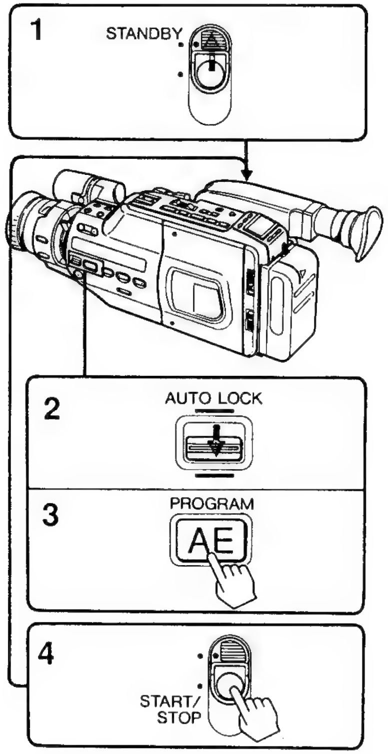
When you attach the battery at the first time
The white balance, focus and exposure are automatically adjusted and the shutter speed is set to normal speed (1/50) regardless of the position of AUTO LOCK.

Notes
- As long as you do not remove the battery, even if you set POWER to OFF, the previous settings are stored.
- When you set AUTO LOCK to the lower position, the items remain in auto mode or previously set manual mode until you change it.

(I-1)



(I-2)



Using the PROGRAM AE Button

Besides the automatic and manual modes, this camcorder has the Portrait and Sports modes. You cannot adjust the shutter speed manually while PROGRAM AE is activated.

Using the Portrait Mode

(I-1)
In the portrait mode, the object is in focus and the background is out of focus. The opening of the iris and the shutter speed is automatically adjusted to maintain the appropriate exposure according to the size and brightness of the object. The portrait mode is most effective to be used outdoors.

Use the portrait mode when shooting the following subjects:
- a still subject such as person or flower
- zooming in a subject in the telephoto mode
- subjects beyond obstacles such as net

Operation (I-2)

1 **Slide STANDBY up.**

2 **Set AUTO LOCK to the lower position.**

3 **Press PROGRAM AE until appears in the display window.**

4 **Press START/STOP.**
Recording with the portrait mode starts.

To resume the automatic mode
Press PROGRAM AE until neither nor appears in the display window or set AUTO LOCK to the green position.

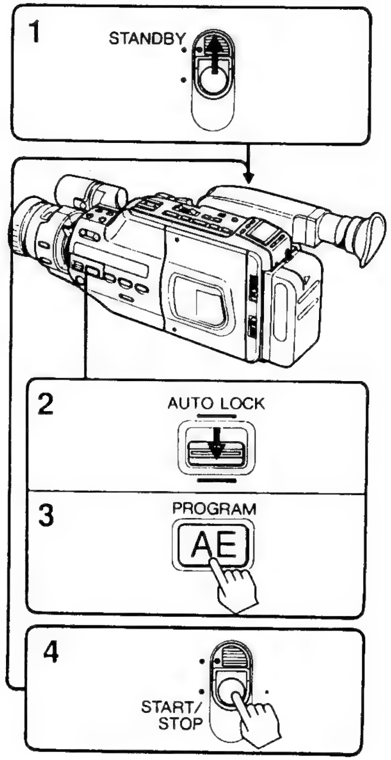
Hint for effective camera work
Use of the portrait mode in the following method will gradually bring the background out of focus while keeping the object in focus.
1 Enter the portrait mode, following the above steps 1 to 3.
2 Set the AUTO LOCK switch to the green position and start recording.
3 Set the AUTO LOCK switch to the lower position.
The camcorder brings the background out of focus.

Note
When recording under fluorescent, sodium, or mercury lamp, the brightness of the recorded picture may flicker, or the colour of the recorded picture may become unnatural.

(I-3)



(I-4)



Using the Sports Mode

(I-3)
In the sports mode, the shutter speed and the opening of the iris is automatically adjusted to maintain the appropriate exposure according to the speed of the object. An object moving in high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow mode. The sports mode achieves more effective recording compared to using the SHUTTER SPEED select button.

Use the sports mode when shooting following subjects:
- outdoor sports scene such as football, tennis or golf
- recording a landscape in the running car

Operation (I-4)

1 **Slide STANDBY up.**

2 **Set AUTO LOCK to the lower position.**

3 **Press PROGRAM AE until appears in the display window.**

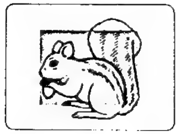
4 **Press START/STOP.**
Recording with the sports mode starts.

To resume the automatic mode
Press PROGRAM AE until neither nor appears in the display window or set AUTO LOCK to the green position.

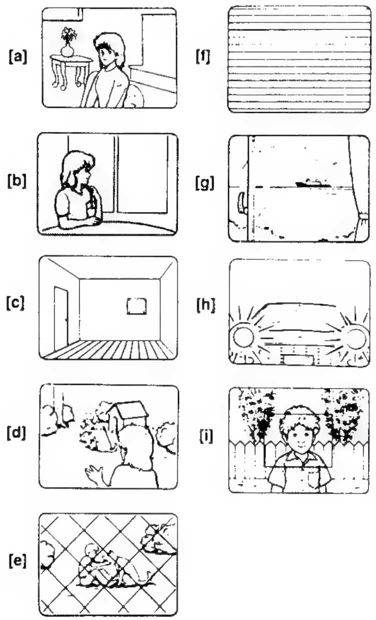
Hint for effective camera work
When shooting athletic matches from a distance, such as a football game, we tend to zoom from the wide to the telephoto position to catch the once-only events. Even under these circumstances, by using the sports mode, a sharp picture can be obtained when played back later in the slow or still mode.

Notes
- The sports mode is effective under sufficient lighting, such as under sunlight. When used under extremely dark conditions, the shutter speed may not be shifted to high speeds.
- When recording under fluorescent, sodium, or mercury lamp, the brightness of the recorded picture may flicker, or the colour of the recorded picture may become unnatural.

(J-1)



(J-2)



Manual Focusing

When you set AUTO LOCK to the green position and set the subject to the center of the viewfinder, the autofocusing functions and you can easily get a focused picture under most shooting conditions. **(J-1)** But manual focusing is recommended in the following cases.
[a] to [i] correspond to the illustrations. **(J-2)**

[a] Insufficient light
[b] Too much brightness behind the subject
[c] Subjects with little contrast-wall, sky, etc.
[d] One subject is close; the other is in the center, but at a distance
[e] Subjects beyond nets, etc. or another subject passes in front of the camcorder
[f] Horizontal stripes
[g] Subject through frosted glass
[h] Bright subject or subject reflecting light
[i] High contrast behind the subject (The background may be focused.)

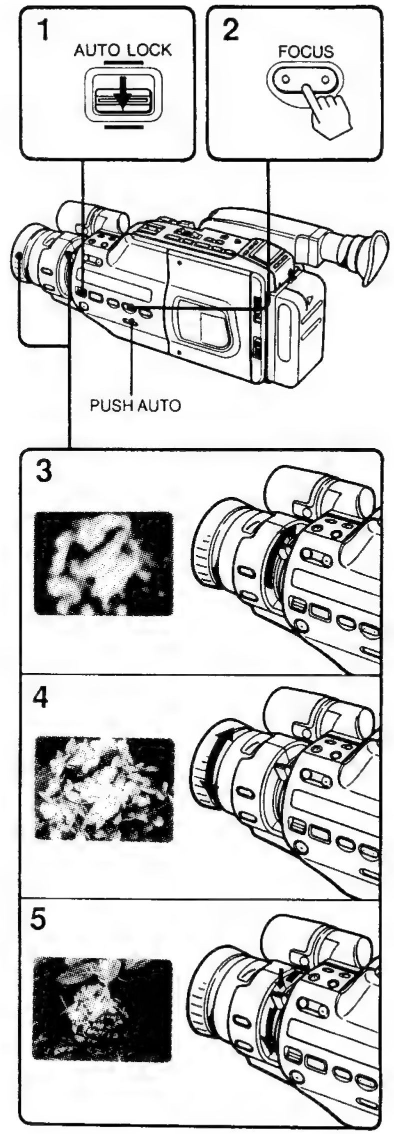
- When you use conversion lenses or effect filters
- When shooting in close-up (Macro)
- When shooting a stationary subject using a tripod
- To save battery wear

Autofocusing does not function momentarily when:

- The shutter speed is changed, or the back light adjustment is changed to manual mode.
- Lighting conditions change quickly.
- Zooming is done from wide-range to telephoto.

This camcorder keeps in focus by referring to the picture contrast, which is weak in the above situations.

(J-3)



Focusing Manually

(J-3)

1 **Set AUTO LOCK to the lower position.**

2 **Press FOCUS.**
Make sure that the autofocus zone in the viewfinder disappears.

3 **Turn the manual zoom lever fully to the telephoto position.**

4 **Turn the focus ring to achieve sharp focus.**

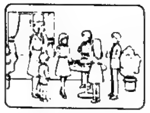
5 **Set the desired shot length using the manual zoom lever, while pressing the gray button for wide-angle.**

Shooting with autofocusing momentarily
While shooting with manual focusing, press PUSH AUTO.
The autofocus functions **while you are pressing the button.** When you release the button, manual focusing will be resumed. Use this button when you change the focus from one subject to another. The focusing performs naturally.
The previous settings except for focusing are retained.

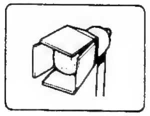
Some helpful hints

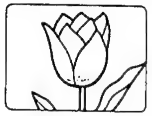
- When shooting in relatively dark places such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles after focusing in telephoto.
- When shooting a scene with lots of movement in bright light, set the zoom lever to the wide-angle position and the focus ring to 2 to 3 m.

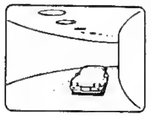
(K-1)

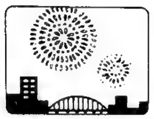
[a] 



[b] 

[c] 

[d] 

[e] 

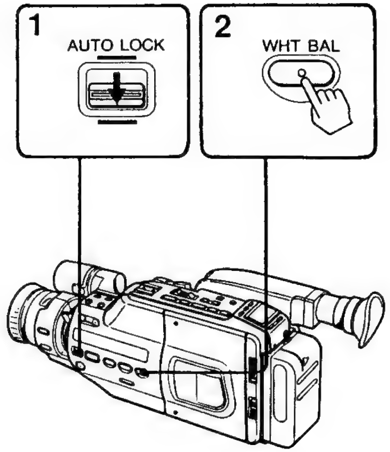
[f] 

Adjusting the White Balance

When you set AUTO LOCK to the green position (AUTO), the auto white balance function of this camcorder adjusts the picture to natural colours under most shooting conditions. However, in the conditions listed below, adjust the white balance manually.
[a] to [f] correspond to the illustrations **(K-1)**

	Conditions	Indication in the viewfinder
[a]	Lighting conditions change quickly	-Ò-
[b]	Too bright, such as in photograph studios	-Ò-
[c]	Monochromatic subject or background	HOLD
[d]	Under a sodium lamp	-Ò-
	Under a mercury lamp	-Ò-
	Under a colour matching fluorescent lamp	☼
[e]	Recording outdoors: a night view, neon signs or fireworks	☼
[f]	Recording outdoors: scenes after sunset or before sunrise	☼

(K-2)



Adjusting the White Balance Manually

(K-2)

1 Set AUTO LOCK to the lower position.

2 Select the desired white balance mode by pressing WHT BAL.
Each time you press the button, the indication changes as follows.

No indication → HOLD → ☼ → -Ò- (→ back to No indication)

Note on manual adjustment
When moving from indoors to outdoors, or vice versa, set AUTO LOCK to the green position and adjust the white balance in auto mode, then reset to the lower position again.

What is the HOLD mode?

In the HOLD mode, the camcorder adjusts to the colour temperature of the subject's light source automatically and keeps that temperature during recording. When recording some subjects with different colour temperatures, use the HOLD mode to set a colour temperature and you can achieve a recording with natural colours without being affected by the surroundings.

To set into the HOLD mode

1 Set AUTO LOCK to the lower position and press WHT BAL to set to Auto (no indication).
2 Point at and record a white, flat object such as a white wall, or paper.
3 Press WHT BAL.
The HOLD mark appears in the viewfinder.

When you change the battery pack, setting of the white balance, or the light source, follow the procedures above again.

Colour Temperature and White Balance

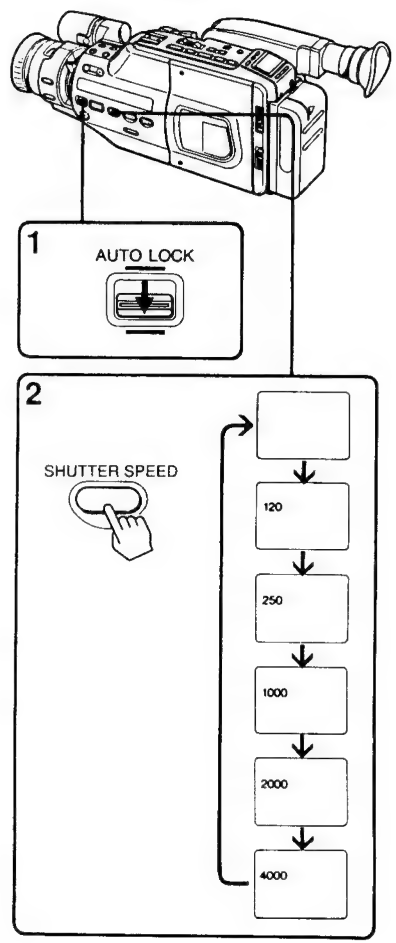
The colour temperature indicates a property of light and is measured in K (Kelvin). It increases as the light source gets bluer and decreases as the light source gets redder. It has no direct relationship with brightness.
The camcorder automatically adjusts the white balance within the range shown below.

Colour temperature (K)	Light source
Blue 10,000	Clear sky
8,000	Slightly overcast
7,000	Cloudy, rainy
6,000	Fluorescent lamp (daylight)
5,000	
White 4,000	Direct sunlight Fluorescent lamp (white) 1 hr. after/before sunrise/sunset Fluorescent lamp (off-white) Studio lamp Halogen lamp
3,500	
3,200	
3,000	Tungsten lamp
Yellow 2,500	30 min. after/before sunrise/sunset
Red 2,000	Sunrise/sunset Candlelight

(L-1)



(L-2)



Setting Shutter Speed

(L-1)

When you record a fast-moving subject, set the shutter speed at a higher.The movement will look more clearly when played back in pause mode.
Remember that you record in a brighter place than usual.

Recommended setting for your situation

Example use	Recommended shutter speed
• On clear days, recording golf or tennis swing (To view the hit ball clearly in the still picture mode, set to 1/4000) • Recording skiers	1/4000 or 1/2000
• On overcast days, recording a moving merry-go-round or roller coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/1000 or 1/250
• Instead of the ND2 filter (To reduce the exposure level to about a half) • Recording indoor sports (for stable shooting)	1/120

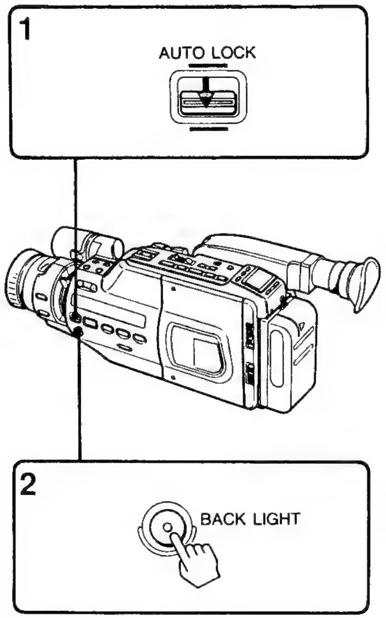
Selecting the Shutter Speed (L-2)

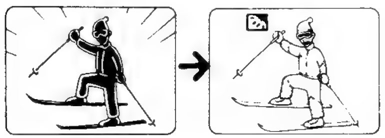
1 Set AUTO LOCK to the lower position.
Make sure that neither or appears in the display window.

2 Press SHUTTER SPEED repeatedly until the desired shutter speed indication appears.

Notes
- When you select shutter speed 1/250 or faster, record under sunlight or use a video light.
- When you record a TV screen with certain shutter speeds, the brightness of the recorded picture may vary.
- When you shoot a very bright subject at a faster shutter speed, a light vertical, belt-like line ("smear") may appear on the screen.
- When you record at certain shutter speeds under a light discharged tube, such as a fluorescent lamp, sodium lamp or mercury lamp, the brightness of the recorded picture may vary ("flicker").

(M)





Shooting with Backlighting

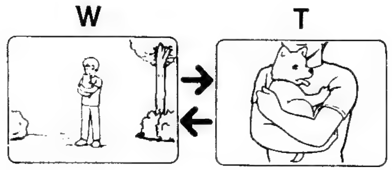
In this camcorder, the exposure is automatically controlled. However, when shooting a subject that is backlit, that is, if the light source is coming in from the back of the subject, use the BACK LIGHT button. **(M)**

1 **Set AUTO LOCK to the lower position.**

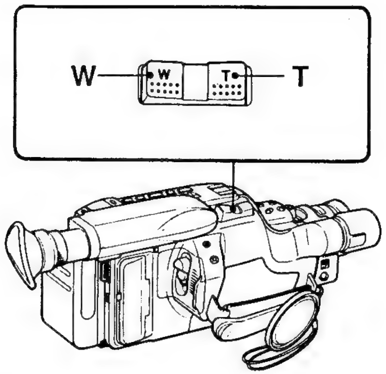
2 **Press BACK LIGHT.**
The indication appears. If it does not appear, press the button again.

After shooting
Be sure to release this adjustment condition by pressing BACK LIGHT again. (The indication goes out.)
Otherwise, the recorded picture will be too bright.

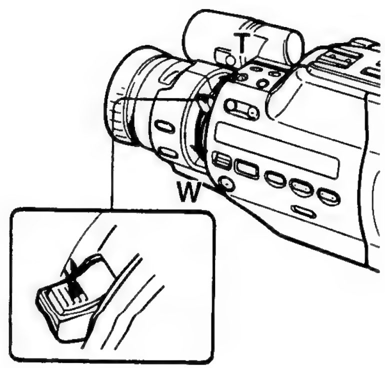
(N-1)



(N-2)



(N-3)



Zooming

The size of the subject in the scene can be changed. Use "zoom-in" for dramatic close-ups. Use "zoom-out" for panoramic long shots. Also use zooming to focus manually or to decide the shooting angle. **(N-1)**

Power Zooming

— for smooth and constant zooming (N-2)

Press the T side of the power zoom button for telephoto (subject appears closer) and the W side for wide-angle (subject appears farther away).

Zooming Manually

— for creating a dramatic effect (N-3)

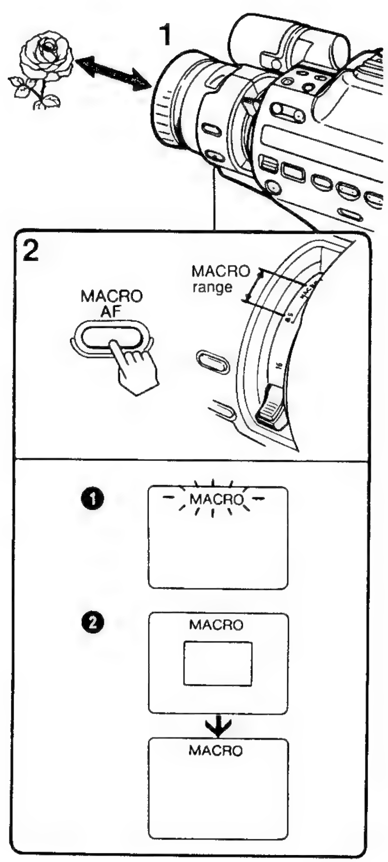
Turn the manual zoom lever upward for telephoto and downward for wide-angle.
Be sure to keep pressing the gray button on the lever when turning it downward.

Focal length of this camcorder
The focal length is 8.5 mm to 68 mm. This means approximately 45 mm to 363 mm converted into the focal length of a 35-mm camera.

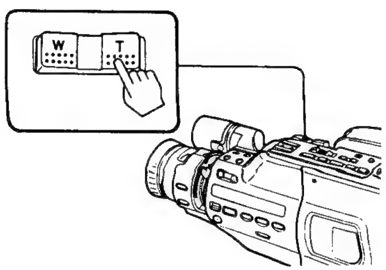
When shooting with autofocusing
Set the zoom lever to the wide angle position. The focus ring will be fixed around the 2 m position and may not exactly match the actual object-to-camera distance.

Close-up (Autofocusing in Macro)

(O-1)



(O-2)



Even tiny subjects, such as flowers, insects, photographs, can literally fill the screen with autofocusing in macro.
This is useful also when storing a title (page 42). **(O-1)**

1 Bring the camcorder as close as necessary to obtain the desired subject size.
The subject can be as close as a minimum of 10 mm from the lens surface.

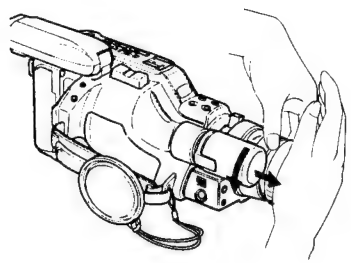
2 Press MACRO AF.
❶ The zoom lever turns automatically to the MACRO range.
The MACRO indication blinks in the viewfinder and lights steadily when the zoom lever enters the MACRO range.
❷ The autofocus zone appears in the viewfinder and the focus is adjusted automatically.
The autofocus zone disappears when sharp focus is achieved.

To release this adjustment setting
Press the T side of the power zoom button or turn the zoom lever to return the lever to the ordinary range. **(O-2)**

If the autofocus zone disappears before focusing sharply
The autofocus zone disappears if sharp focus cannot be achieved within 30 seconds. In this case, press MACRO AF again to re-function autofocusing in macro.
If you still do not get a sharp focus, manual focusing is recommended (see page 40). Adjust it after the autofocus zone goes out.

To keep autofocus functioning
Keep MACRO AF pressed.
Contrary to the ordinary autofocusing, autofocusing in macro is released each time the sharp focus is achieved.

(O-3)



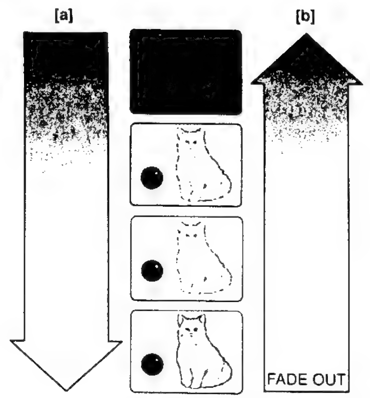
Notes
- This function has no connection with the AUTO LOCK switch. You can use autofocusing in macro while manually adjusting the ordinary focus, etc.
- Do not press the power zoom button while the zoom lever is moving for autofocusing in macro. Otherwise, autofocusing is released.

Manual focusing in macro
1 Turn the zoom lever to the MACRO range without pressing the gray button on it.
The MARCRO indication lights up in the viewfinder.
2 Turn the zoom lever within the MACRO range to focus sharply.

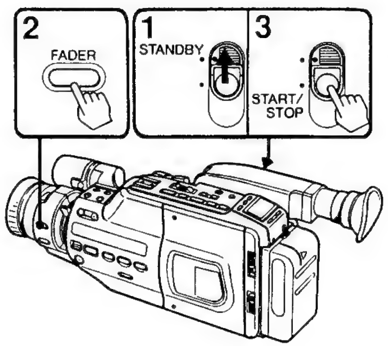
If the lens hood touches the subject
Remove the lens hood. Hold the focus ring and turn the hood by pressing it with your palm. **(O-3)**
Do the same when attaching/removing a filter or conversion lens (not supplied).

Recommended accessory
When shooting in macro, the depth of field is very shallow, so pay attention to focusing. To keep the subject in focus, use a tripod.

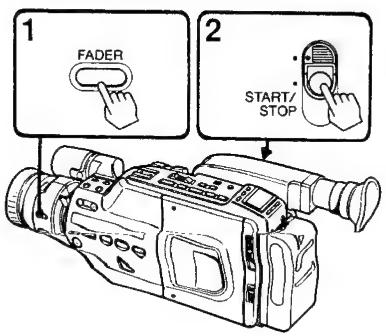
(P-1)



(P-2)



(P-3)



Fade-in and Fade-out

When fading-in, the picture will gradually appear from black.
The sound will also be gradually increased.
(P-1 [a])
When fading-out, the picture will gradually fade to black. The sound will be decreased. **(P-1 [b])**
This function will give your recording a professional appearance.

To Fade-in

(P-2)

1 **Slide STANDBY up to set the camcorder in the standby mode.**

2 **Press FADER.**

3 **Press START/STOP.**
Fade-in is performed and recording will start.

To Fade-out

(P-3)

1 **While recording, press FADER.**

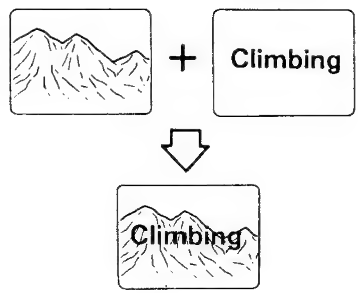
2 **Press START/STOP to stop recording.**
Fade-out is performed and then recording stops.

To cancel the fade-in/fade-out function
Before pressing START/STOP, press FADER again.

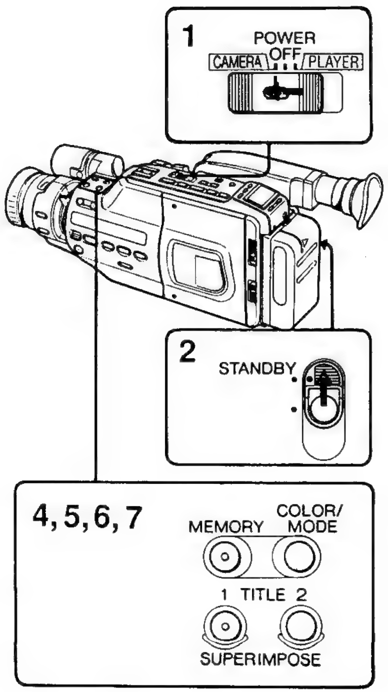
If you want to use the fade-in/fade-out function repeatedly
Start from step 1 each time.

When the title (page 43), date/time (page 24), or age (page 48) is displayed
The title, date/time, or age does not fade-in or fade-out.

(Q-1)



(Q-2)



Recording a Title

You can superimpose your own hand-lettered message or illustration over the picture during recording or playback (editing). **(Q-1)**

- Two titles can be stored.
- The colour of the title can be selected from 8 colours.
- You can use the titles separately or simultaneously.
- You can record a picture with one title and display another title on this picture during playback.

Before recording, store a message or an illustration.

Storing a Title (Q-2)

Before storing

- Make a desired title card.
  Use a plain, white card and draw a title with a dark colour in thick letters.
- Install the lithium battery. (page 18)

Operation

1 **While pressing the green button, set POWER to CAMERA.**

2 **Slide STANDBY up to set the camcorder in the standby mode.**

3 **Point the camcorder to the title card and adjust the focus.**

4 **Press TITLE 1 or 2.**

5 **Press MEMORY to store the title.**

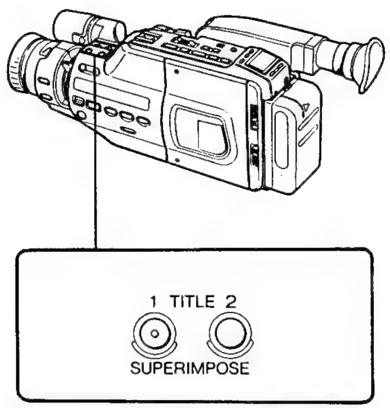
6 **Press COLOR/MODE and select the title colour.**
Each time you press the button, the indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN → RED
↳ BLK (black) ← YEL (yellow) ← VIO (violet) ←

7 **Press TITLE 1 or 2 which is pressed in step 4 to turn off the title.**

To check the title
Press TITLE 1 or 2 in the standby mode.
To turn off the title, press the button again.

(Q-3)



Superimposing the Title on a Picture

(Q-3)

1 **During playback or recording, press TITLE 1 or 2 at the point from which you want to insert the title.**
The title is displayed. During recording, the title is recorded.

2 **Wait for a while and press TITLE 1 or 2, whichever was pressed in step 1, again.**
The title goes out.

Superimposing two titles on a picture

1 During playback or recording, press TITLE 1 and 2 at the point from which you want to insert the titles.
To display title 1 in front of title 2:
while pressing TITLE 2, press TITLE 1.
To display title 2 in front of title 1:
while pressing TITLE 1, press TITLE 2.

2 Wait for a while and press TITLE 1 or 2.
The titles go out.

When recording the title at the beginning, or two titles simultaneously
We recommend the following method:
1 Set the camcorder in the standby mode before step 1 above.
2 Release the standby mode after displaying the title, then go to step 2 above.

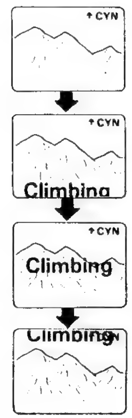
If you want to record the title during playback
Make connections for editing and record the title on another VTR. (See page 55).
During playback, the title cannot be recorded on this camcorder.

About the colour indication
• The colour indication in the viewfinder is not recorded.
• You can change the title colour by pressing COLOR/MODE even after displaying the title.

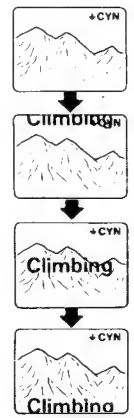
About the display mode indication
The display mode indication in the viewfinder is not recorded.

During superimposing in the record mode
If you press EDITSEARCH, the title goes out. After performing the editsearch or recording review function, the title appears again.

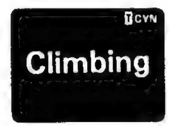
(Q-4)



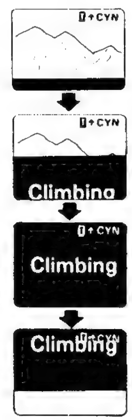
(Q-5)



(Q-6)



(Q-7)



(Q-8)



Various Display Modes of the Title

Display mode	Indication in the viewfinder
Scrolling up the title (Q-4) The title scrolls up and stops at the center.	↑
Scrolling down the title (Q-5) The title scrolls down and stops at the center.	↓
Reversing the title with the picture (Q-6)	▯
Scrolling up the reversed title (Q-7)	▯↑
Scrolling down the reversed title (Q-8)	▯↓
Normal display mode	No indication

Selecting the display mode
Before displaying the title, press COLOR/MODE until the indication of the mode you want appears. (**Q-9** in page 45)

After selecting the mode, follow the procedure on page 43 to superimpose the title on the picture in that mode.

Note on scrolling
You can scroll the title only when the camcorder is in the recording standby, recording, or normal playback mode. In the other modes (see "Playing back a tape" on page 52), you can select only reversing (▯) or normal display mode. Also scrolling will be cancelled when you set the camcorder in the other modes after selecting scrolling.

About memory back up
The camcorder uses the lithium battery on the bottom to keep the title in memory. On lithium battery life, see page 18.

(Q-9)



Function of the COLOR/MODE button
This button has a double function: one is to select the title colour and the other is to select the title display mode.
Its function depends on if the title is displayed or not. **(Q-9)**

To select the colour
1 Press TITLE 1 or 2 to display the title.
2 Press COLOR/MODE.
Each time you press the button, the colour indication changes as follows:
WHT (white) → BLUE → GRN (green) → CYAN → RED
↑— BLK (black) ← YEL (yellow) ← VIO (violet) ←┘

To select the mode
1 If the title is displayed, press TITLE 1 or 2 so that the title disappears.
2 Press COLOR/MODE.
Each time you press the button, the mode indication changes as follows:
No indication (normal mode) → ↑
↑— ▯↓ ← ▯↑ ← ▯ ← ↓ ←——┘

↑ : Title scroll up mode
↓ : Title scroll down mode
▯ : Title reverse mode
▯↑ : Title reverse and scroll up mode
▯↓ : Title reverse and scroll down mode

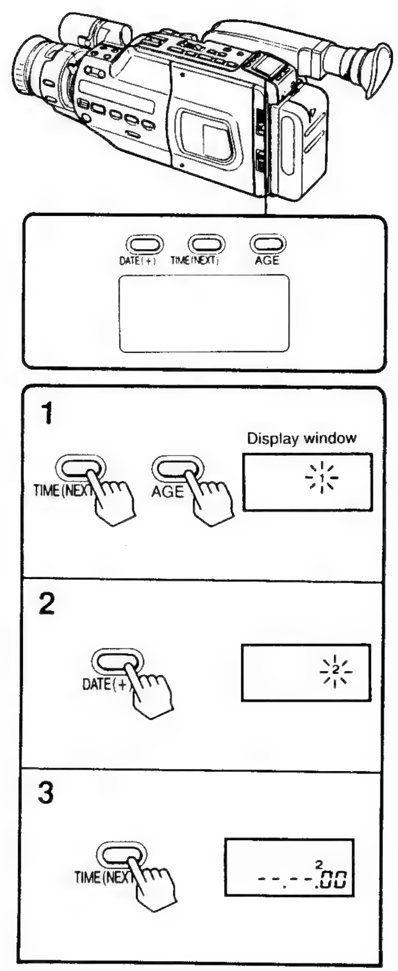
When you display both titles simultaneously
You can display both titles only in the same mode.
To scroll both titles simultaneously, display the titles as descibed in "Superimposing two titles on a picture" (page 43), however, press the first and second buttons continuously.

To change the colour of the titles displayed simultaneously
- If you want to change the colour of the title in back, press COLOR/MODE to change the color.
- If you want to change the colour of the title in front, proceed as follows.

1 Press TITLE 1 and 2 so that the titles disappear.
2 Press TITLE 1 or 2 to display the title which you want to change the colour.
3 Press COLOR/MODE to change the colour.
4 Press the same button as in step 2 so that the title disappears.
5 Display both titles as described in "Superimposing two titles on a picture" (page 43).

—25—

(R-1)



Recording the Age of Your Child

You can record the age (in years and months) of your child, by presetting his/her birth date.
Besides age, you can also preset the date of a specific event, and record how many years and months have passed since then.
You can record up to 3 ages or events.

Storing the Birth Date or Special Event

Before you begin

- Make sure that a power source is connected.
- Set POWER to CAMERA.
- Slide STANDBY up.
- Make sure that the date is correctly set.

Operation (R-1)
Example: Store "Aug. 3, 1987" in memory 2.

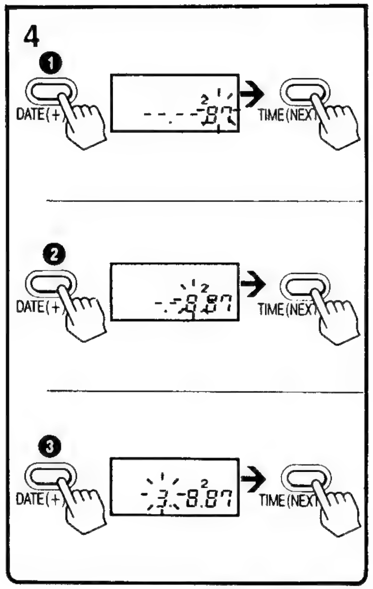
1 **Press TIME (NEXT) and AGE simultaneously for more than 3 seconds until the "1" indication appears and "1" blinks in the display window.**

2 **Press DATE (+) to select 2.**
Each time you press DATE (+), the display in the display window changes as follows:
1 → 2 → 3
↑————┘
In the viewfinder, the display changes as follows:
[1] BIRTHDAY → [2] BIRTHDAY
↑——— [3] EVENT* ←┘

* Although "EVENT" is displayed on [3], you can use it for age as well.
[1] and [2] can also be used for event.

3 **Press TIME (NEXT).**
"--. --. 00" appears.

(R-2)



(R-2)

4 Adjust the year, month and day.
First adjust the blinking digits with DATE (+), and then press TIME (NEXT).
The age (year and month) appears when all the items are adjusted.

If you missed the correct number with DATE (+)
Keep pressing DATE (+).
The indication changes as follows:

Year: 00 → 01 → Current year
↑ Current year – 99 ←

Month: - - → 1 → 2 - - - → 12
↑___________________|

Day: - - → 1 → 2 - - - → 31
↑___________________|

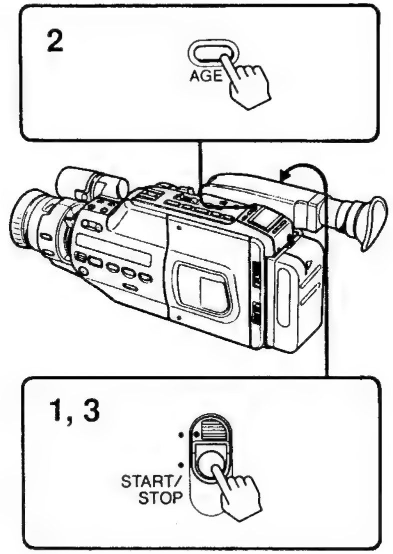
To correct/change the setting
Follow the procedures from step 1 again.

To advance the digits faster
Keep DATE (+) pressed.

To preset the year before 1900
1 After step 3 on page 46, keep pressing DATE (+) until the current year is displayed.
2 Press DATE (+) again.
The year goes back 99 years.
(example: 1990 → 1891)
3 Go to step 4 above.

When in 2000
"--. --. 01" is displayed in step 3 on page 46. After that, it advances every year as "1902, 1903, ... ".

(R-3)



Recording the Age

(R-3)

1 During recording, press START/STOP at the point where you want to insert the age of a person or the elapsed time.
The camcorder is set in standby mode.

2 Press AGE to select the indication you want to record.
Each time you press AGE, the indication changes as follows:

→ No indication → [1] The first age
[3] Anniversary ← [2] The second age

An item with no presetting is skipped.
The [1], [2], or [3] indication goes out after one second.

3 Press START/STOP.
Recording starts again.
The indication in the viewfinder is recorded with the picture.

To stop recording the age
Press AGE until the indication goes out.

To change the display while recording
Press AGE until the indication you want to record is displayed. Recording of the indication you selected starts when [1], [2], or [3] goes out.

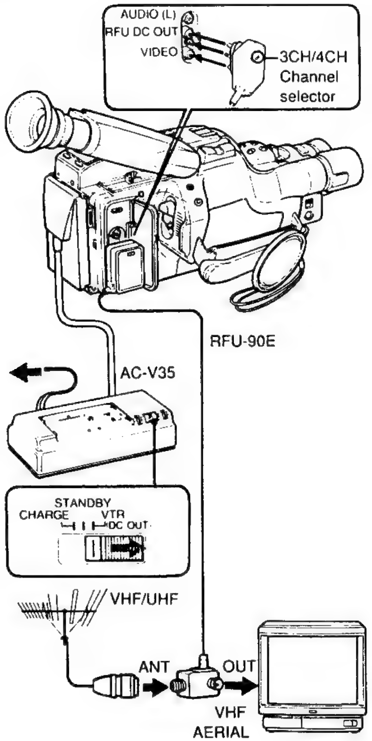
To cancel the stored birth date or special day
1 Perform steps 1 and 2 in "Storing the birth date or special event" to select the memory number to be canceled.
2 Press TIME (NEXT) twice.
The month indication blinks.
3 Press DATE (+) until -- appears.
4 Press TIME (NEXT).
The birth date/special day is deleted from the memory and is not displayed when you press AGE.

If you do not record the age while recording
You cannot add it later during playing back or editing. Be sure to follow the procedure "Recording the age" while recording.

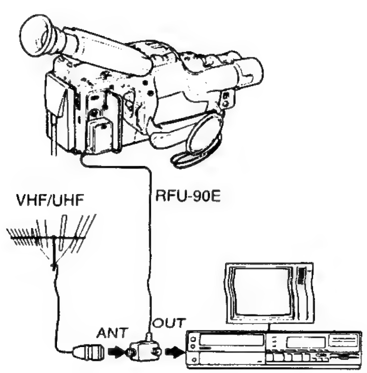
About memory back-up
The camcorder uses the lithium battery on the bottom to keep the birth date/event date in memory. On lithium battery life, see page 18.

When you connect the camcorder to a TV
If you do not use the data-screen function, the age indication will appear on the TV screen when the [1], [2], or [3] indication goes out in the viewfinder and recording starts.

(S-1)



(S-2)



Connections for Playback

To view the playback picture on the TV screen, the camcorder and the TV and/or VTR must be connected properly. Check the type of your TV and go to the appropriate section to make the necessary connections.

Connecting a TV without Video/Audio Jacks

For the customers supplied with the FRU-90E

Step 1

Connecting an RFU adaptor and a TV (S-1)

- Use the supplied RFU adaptor.
- The playback sound is monaural.
- Make sure that the TV is turned off to prevent the speaker being damaged.
- Set the CHARGE/VTR selector on the AC power adaptor to VTR (DC OUT), when you use the AC power adaptor as a power source.
- Usually keep the RFU adaptor and the TV connected.

Step 2

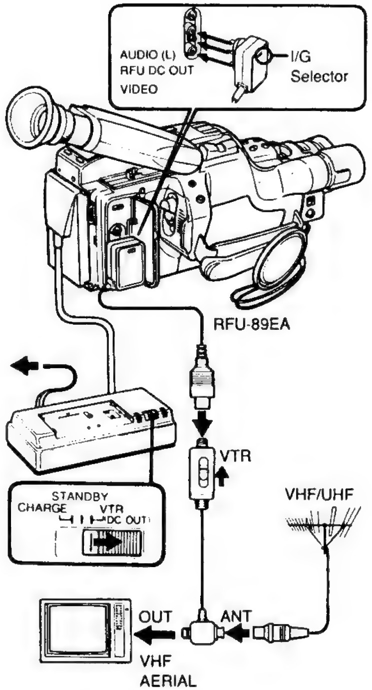
Adjusting the TV

1 Select the RF unit selector on the adaptor to 3CH or 4CH, whichever is not active in your area.
2 Turn on the TV and select the 0 position.
3 Tune the TV so that you can get picture and sound from the camcorder.

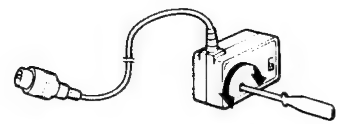
If your TV is connected with a VTR (S-2)
Disconnect the aerial connection for the TV and VTR, and insert the RFU adaptor between them.

Note
When you watch a TV programme, turn off the camcorder or disconnect the RFU adaptor from the camcorder.

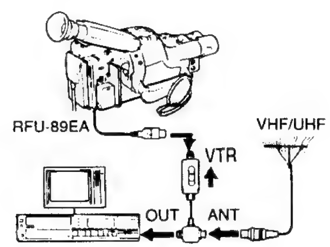
(S-3)



(S-4)



(S-5)



For the customers supplied with the RFU-89EA

Step 1

Connecting an RFU adaptor and a TV (S-3)

- Use the supplied RFU adaptor.
- The playback sound is monaural.
- Make sure that the TV is turned off to prevent the speaker being damaged.
- Set the CHARGE/VTR selector on the AC power adaptor to VTR (DC OUT), when you use the AC power adaptor as a power source.
- Set the selector switch on the aerial selector to VTR.
- Usually keep the RFU adaptor and the TV connected.

Step 2

Adjusting the TV

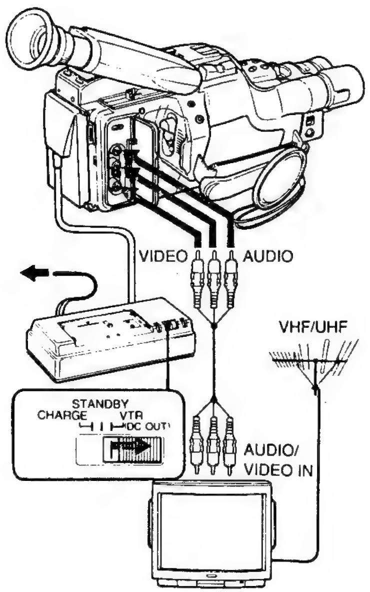
1 Set the I/G selector on the RFU adaptor according to the TV system of your country.
2 Turn on the TV and select a programme position that is not used to receive a TV station.
3 Set POWER of the camcorder to CAMERA, insert a tape and slide STANDBY up.
4 Tune the TV so that you can get picture and sound from the camcorder.

When the playback picture is not free from disturbance

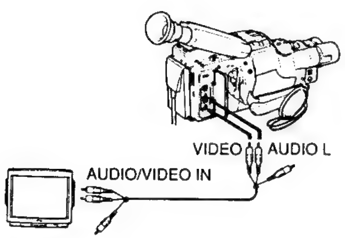
1 Set the selector switch of the aerial selector to ANT.
2 Select a programme position on the TV between UHF channels 30 and 39, so that the TV shows no picture and a steady rustling sound or no sound is heard.
3 Set the selector switch of the aerial selector to VTR.
4 Turn the RF channel setting screw of the RFU adaptor slowly with the supplied screwdriver so that playback picture is clearly displayed on the TV screen. **(S-4)**

If your TV is connected with a VTR (S-5)
Disconnect the aerial connection for the TV and VTR, and insert the RFU adaptor between them.

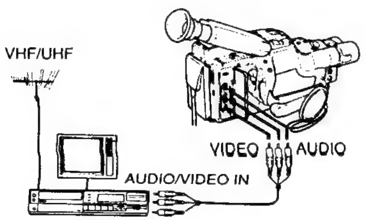
(S-6)



(S-7)



(S-8)



Connecting a TV with Video/Audio Input jacks

By connecting the stereo type TV as shown in **(S-6)**, you can enjoy the stereo sound.

- Use the A/V cable.
- Make sure that the TV is turned off to prevent the speaker being damaged.
- Set the CHARGE/VTR selector on the AC power adaptor to VTR (DC OUT), when you use the AC power adaptor as a power source.

If your TV is a monaural type (S-7)

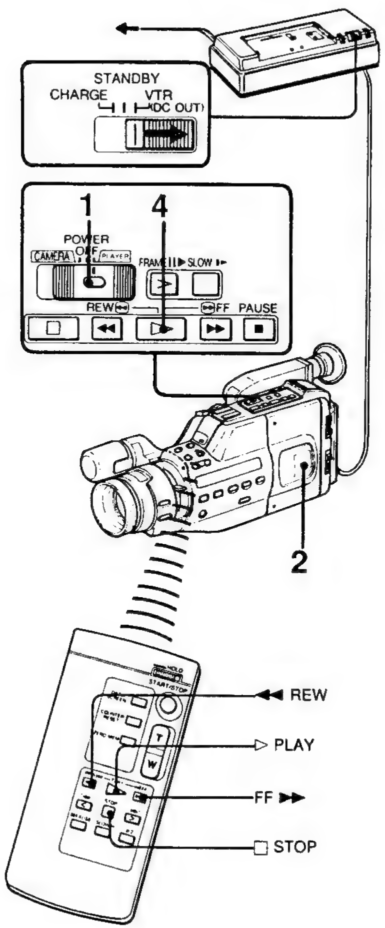
1 Connect the yellow pins to VIDEO on the camcorder and to VIDEO IN on the TV and the white pins to AUDIO L of the camcorder and to AUDIO IN on the TV.
Leave the red pins of both ends free.

2 Set HiFi SOUND on the camcorder to ●.

If your TV is connected with a VTR (S-8)

Connect the camcorder to the VTR instead of the TV.

(T-1)



Playing Back a Tape

The supplied wireless Remote Commander is useful to control the camcorder from a distance. When using it, be sure to set the ▣ REMOTE COMMANDER ON/OFF switch to ON.
(T-1)

1 **Set POWER to PLAYER while pressing the green button.**

2 **Insert a tape.**

3 **Turn on the TV (or the VTR).**
For a TV with video/audio input jacks, set the TV/VIDEO selector to VIDEO.
For a TV without video/audio input jacks, select the channel for playing back the camcorder.

4 **Press ▷.**
Playback begins.

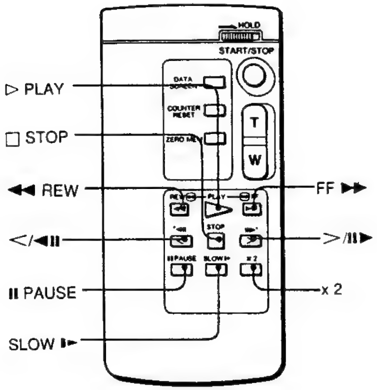
To stop playback, press □.
To rewind the tape, press ◀◀.
To advance the tape rapidly, press ▶▶.

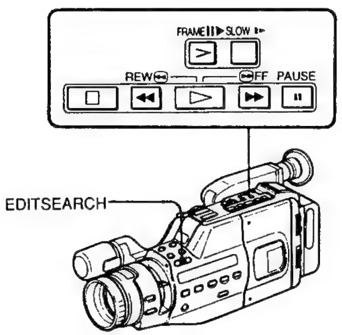
To make the same indications in the viewfinder on the TV, press DATA SCREEN.
To clear them, press it again.

After playing back
Set the POWER switch on the camcorder to OFF and CHARGE/VTR selector on the AC power adaptor to STANDBY.

Note
If POWER is set to CAMERA during playback, the tape stops and the camcorder enters the recording standby mode, resulting in the drain of the battery.

(T-2)





Various Playback Modes (T-2)

To view the still picture (playback pause)
Press PAUSE II during playback.
II appears in the viewfinder.
To resume normal playback, press ▷ or II.

To change the playback direction
Press < /◀II for the reverse or > /II▶ for the forward direction during playback. > on the camcorder is only for the forward direction.
◀ or ▶ appears in the viewfinder.

To view the picture at 1/5 speed (slow playback)
Select the playback direction with < /◀II or > /II▶, and then press SLOW I▶ during playback.
SLOW I▶ on the camcorder is only for the forward direction.
◀I or I▶ appears in the viewfinder.
When slow playback lasts for 1 minute or more, the forward or reverse playback at the normal speed starts automatically, depending on the tape direciton.
To resume normal playback, press ▷.

To view the picture at double speed*
Select the playback direction with > /II▶, and then press x2 on the Commander.
x2 appears in the viewfinder.
To resume normal playback, press ▷.

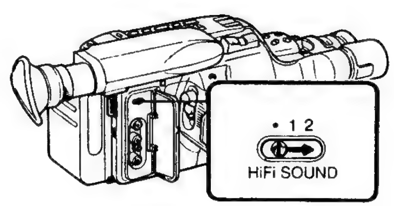
To view the picture frame-by-frame
In the still picture mode, press < /◀II or > /II▶. Each time you press, the picture appears by a frame.
II▶ on the camcorder is only for the forward direction. ◀II or II▶ appears in the viewfinder.
If you keep pressing ◀II/II▶, playback at 1/30 speed starts.
To resume normal playback, press ▷.

To locate the desired scene (picture search)
Keep pressing ◀◀ or ▶▶ during playback or in the still picture mode. ⊖ or ⊕ appears in the viewfinder.
To resume normal playback, release the button.

To locate the desired scene quickly (skip scan)
Press ◀◀ during rewinding or ▶▶ during advancing the tape rapidly. ⊖ or ⊕ appears in the viewfinder.
To resume normal playback, press ▷.

* Only on the Commander.

(T-3)



About the picture in the various playback modes
- Streaks appear other than normal playback mode.
- The picture may shake vertically when playing back in speeds other than normal speed forward mode.

About the sound during playback in the various playback mode
The sound can be heard during playback at double speed in forward direction, but it is a little noisy.

Note on still picture
When the still picture mode lasts for 5 minutes or more, the camcorder automatically enters the stop mode.

If the still picture, frame-by-frame picture, or slow playback picture is noisy
Set the camcoder into the slow playback mode, and press "+" or "–" side of EDITSEARCH on the camcorder until the least noisy picture appears.

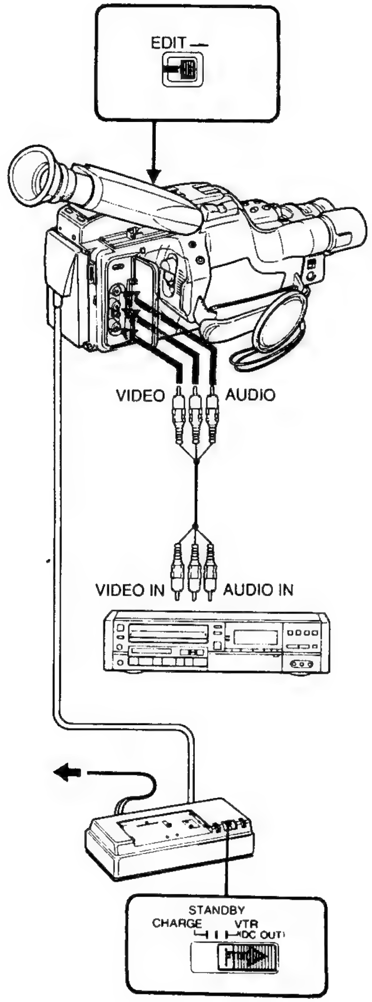
If the still picture shakes
Press "+" or "–" side of EDITSEARCH on the camcorder until the most stable picture appears.

Playing Back the Dual Sound Recorded Tape

(T-3)
Normally set HiFi SOUND to ● position.
When the dual sound recorded tape is played back, set HiFi SOUND to the desired sound, 1 or 2.

Note
When you connect the TV using the RFU adaptor, or when the TV or VTR is a monaural type, set HiFi SOUND to ● position.

(U)



Editing onto Another VTR

You can create your own video programme by editing with any other 8-mm, Hi8 or VHS format VTR. Also you can superimpose and record the titles.

Before you begin

(U)

- Make connections using the A/V cable.
- Set the input selector of the VTR to LINE, if available.
- Set EDIT on the camcorder to the direction of the arrow.

Operation

1 Insert a tape to be recorded on into the recording VTR.
2 Set POWER of the camcorder to PLAYER and insert your recorded tape.
3 Play back on the camcorder and locate the point where you wish to start editing and set the camcorder to the playback pause mode.
4 On the recording VTR, locate the recording starting point and set the VTR to the recording pause mode.
5 Press II of both VTRs simultaneously to start editing.

To stop editing momentarily, press II on the recording VTR.
To edit more scenes, repeat steps 3 to 5.
To stop editing, press □ on both VTRs.

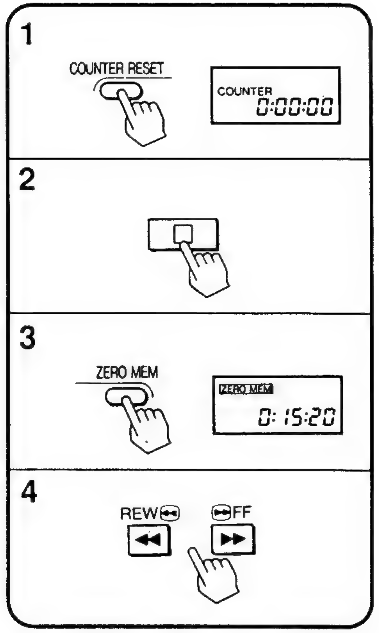
If your VTR is a monaural type
Connect it referring to (S-7) on page 51.

To record a title
You can superimpose and record the titles on the picture while editing.
For details, refer to pages 42 to 45.

If you use the DATA SCREEN function
The indications displayed on the TV screen will also be recorded.

Use of the EDIT switch
Set EDIT to the direction of the arrow (EDIT ON) when editing. Degradation in the quality of picture and sound will be reduced. Avoid using the edited tape for multiple generations of editing. After editing, be sure to set this switch in the opposite direction of the arrow (EDIT OFF).

(V)



Using the Tape Counter

During recording or playback, the digits on the counter indicate the actual recording or playback time.

To Index the Whole Tape

Press COUNTER RESET at the beginning of the tape so that the counter shows "0:00:00". Write down the counter reading at a particular point so that you can easily find that point later by referring to the tape counter.

To Return to a Pre-registered Point

(V)

1 **During playback, press COUNTER RESET at the point you later want to locate.**
The counter shows "0:00:00".

2 **Press □ when the playback has finished, as usual.**

3 **Press ZERO MEM.**
The "ZERO MEM" indicator blinks in the display window.

4 **Press ◀◀ or ▶▶.**
The tape rewinds or advances and stops automatically when the counter reaches approximately zero.

Notes on the tape counter and ZERO MEM button
- The counter reading and the point of the tape may not correspond exactly. Use the counter as a guide. There will be a time lag of several seconds especially when you repeat fast-forward running/rewinding and play back the tape recorded in LP and SP modes mixed.
- Be sure to press ZERO MEM after you stop the tape. It does not function during playback.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to the point where you pre-registered.

(W-1)



(W-2)



Getting Stable Pictures

Take a good posture for shooting (W-1)
For hand-held shots, it is important to hold the camcorder properly.

- Hold the camcorder firmly and secure it with the grip belt so that you can easily manipulate the camcorder with your thumb.
- Place your right elbow firmly against your side.
- Place your left hand under the camcorder to support it. When adjusting the focus manually, make sure the camcorder does not move.
- Stand opposite to the subject and let your feet take a comfortable stance.
- Place your eye firmly against the viewfinder eyecup.

Use a tripod
If you have a tripod for a still camera, it can also be used with the camcorder. If a tripod is not available, try placing the camcorder on a tabletop or any other flat surface of suitable height.

Keep the horizontal plane level (W-2)
The horizontal plane can be easily determined by using the viewfinder frame as a reference.

Planning Ahead

If you are going to edit the tape after recording
Shoot the scene a little longer to make the editing easier.

If you are not going to edit the tape after recording
First record a title and then use the START/STOP button to make a smooth recording.

Lighting

Shoot with the sun behind you
When the light source is behind the subject, or in the following situations, the subject will be recorded too dark and the background too light.

- The subject is indoors and there is a window behind the subject.
- Bright sources such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background. In this case, the face will be recorded too dark.

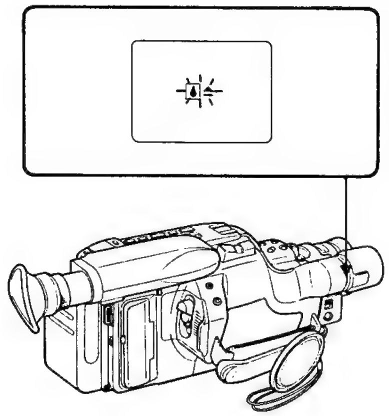
Use video lights in the dark
To get the best colours, a sufficient light level must be maintained.
Photography lamps or halogen lamps are recommended. For best results, use of Sony video lights are recommended since their weight and low heat output levels allow safe, direct connection to the camcorder.
Do not point the light at the camcorder. The high heat from the light can warp the casing of the camcorder.
For detailed instructions on proper use of the light, read its instruction manual.

Brightness levels
Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording technique.

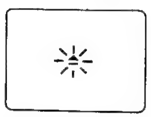
Situation	Brightness	Condition
Snow-covered mountains Snow fields Sandy beach, clear day in summer	Unit: lux	ND filter recom-mended
Clear day, mid day (100,000 lux) Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)	100,000	Normal recording
	10,000	
Overcast day, one hour after sunrise (2,000) Office lit by fluorescent lamps, near window (1,000) Clear day, one hour before sunset (1,000) Department store counter (500 – 700) Station wicket (650)	1,000	
Office lit by fluorescent lamps (400 – 500)	500	
Room lit by two 30 W fluorescent lamps (300) Subway station platform (300)	300	
	100	
Arcade at night (150 – 200)		Video light recom-mended
Theater lobby (15 – 35) Candlelight (10 – 15)	10	

Notes and Precautions

(X-1)



(X-2)



Notes on Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

If moisture condenses inside the unit

(X-1)
Moisture is present inside the camcorder when the ▣ indication in the viewfinder blinks.
If the cassette is inserted, the ⏏ indication also blinks. In such cases, no function except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least 1 hour.
The camcorder can be used again if the ▣ and ⏏ indication do not appear when the power is turned on again.

If moisture condenses on the surface of the tape

(X-2)
If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (▷, ◀◀, etc.) is pressed, the ⏏ indication blinks inside the viewfinder.
In such case, no function except for tape ejection works.
Eject the tape and let the camcorder and the tape sit for at least 1 hour.
The tape can be used again if the ⏏ indication does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens

No caution indications will appear, but the picture becomes dim.
Turn off the power and leave the camcorder unused for at least 1 hour.

(X-3)



Notes on Video Head Cleaning

(X-3)
To ensure clear picture, clean the video heads periodically.
When playback pictures are noisy or hardly visible, the video heads may be contaminated.
[a] Slight contamination
[b] Critical contamination
In such case,

1 Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.
2 After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.
3 If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

—33—

Precautions

On operation

- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor), or 9.0 V (alkaline batteries).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder or the microphone.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap up the camcorder and operate it because heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- Do not put the camcorder on the sand.

On care

- When the unit will not be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera section and player section and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
  Clean the camcorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Note on copyright
Television programmes, films, video tapes and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Using Your Camcorder Abroad

Each country has its own electricity system and TV colour system. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.

Difference in Colour System

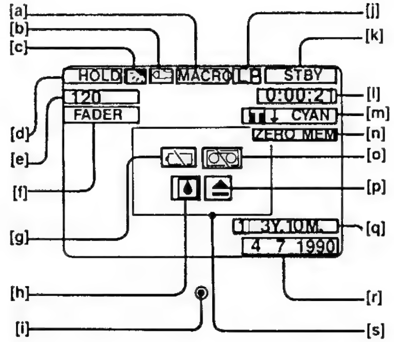
You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be a PAL system based TV. Check the following list (in alphabetical order).

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, West Germany, etc.

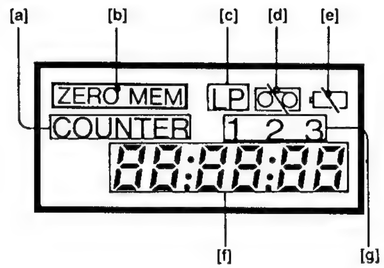
NTSC system countries
Bahama Islands, Canada, Central America, Japan, Korea, Mexico, Taiwan, The Philippines, U.S.A., etc.

SECAM system countries
Bulgaria, France, Hungary, Iran, Iraq, Monaco, Poland, The Soviet Union, etc.

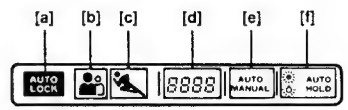
(Y-1)



(Y-2)



(Y-3)



Indications Inside the View-finder and Display Window

Inside the Viewfinder

(Y-1)
[a] MACRO AF is pressed. (MACRO)
[b] WIND is selected. ( )
[c] BACK LIGHT is pressed. ( )
[d] White balance mode. (, , HOLD)
[e] PROGRAM AE setting (,) or Shutter speed
[f] FADER is pressed.
[g] "Exchange battery." ( )
[h] Moisture has condensed. ( )
[i] Shows up during recording.
When blinking: "Exchange battery or tape."
[j] Playback mode (SP/LP)
[k] Tape transport mode
[l] Tape counter
[m] Title mode and colour
[n] ZERO MEM is pressed.
[o] "Exchange tape or no tape inside." ( )
[p] "Trouble has occurred" (≜) or "Clean video heads." ( )
[q] Age
[r] Date or time
[s] Autofocus zone

In the Display Window

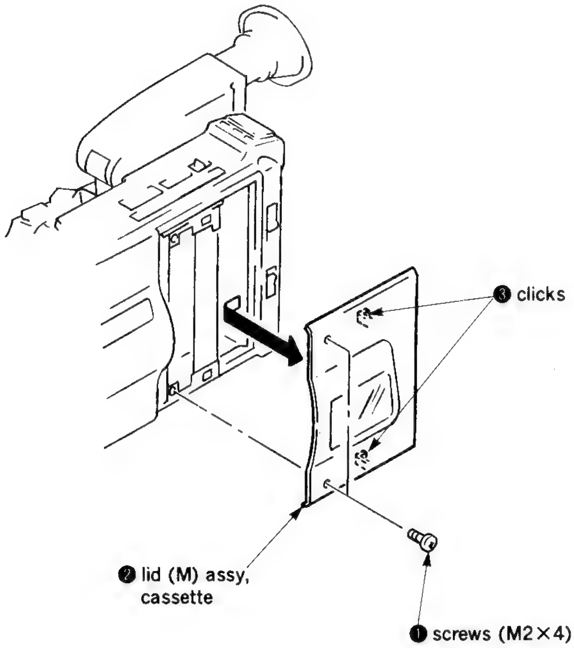
(Y-2)
[a] Appears in counter mode
[b] ZERO MEM is pressed.
[c] Tape speed is LP mode.
[d] "Exchange the tape or no tape inside."
[e] "Exchange the battery."
[f] Counter, or time/date/age indication
Time, date or age is displayed when you press the respective button.
To return to the counter, press the button of the current indication, and check that time/date/age is not displayed in the viewfinder.
[g] Age/event memory number

(Y-3)
[a] Appears in automatic adjustment mode
[b] Appears in portrait mode
[c] Appears in sports mode
[d] Shutter speed
[e] Focus mode
[f] White balance mode

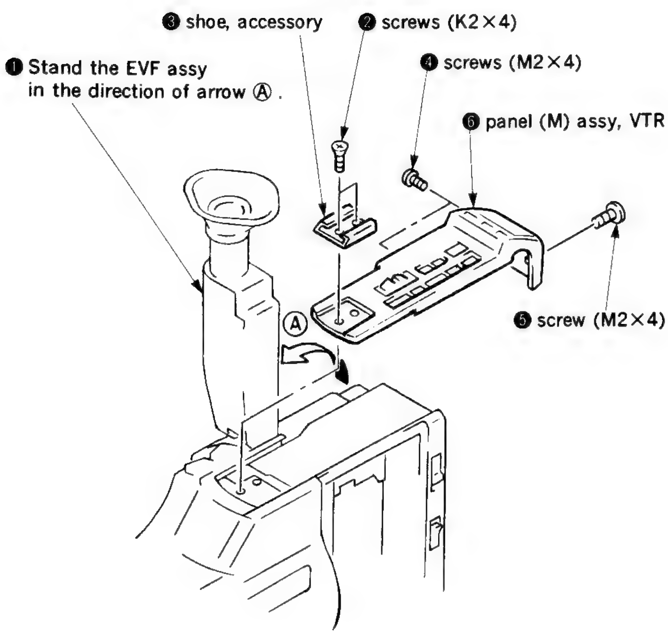
SECTION 2
DISASSEMBLY

2-1. REMOVAL OF CASSETTE LID (M) ASSY

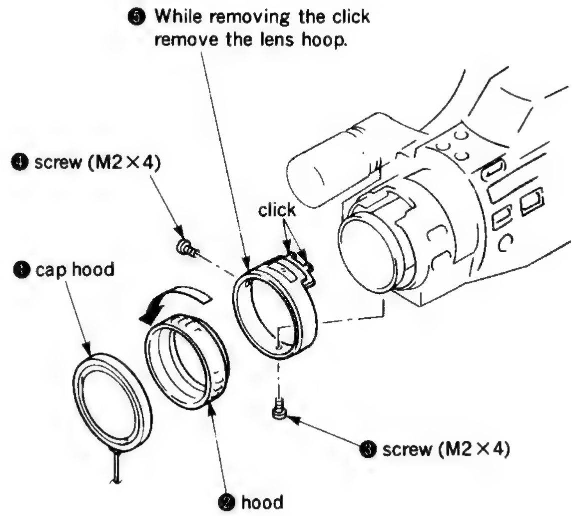
Note : When mounting, fit the click ❸ into holes completely, then clamp two screws ❶.



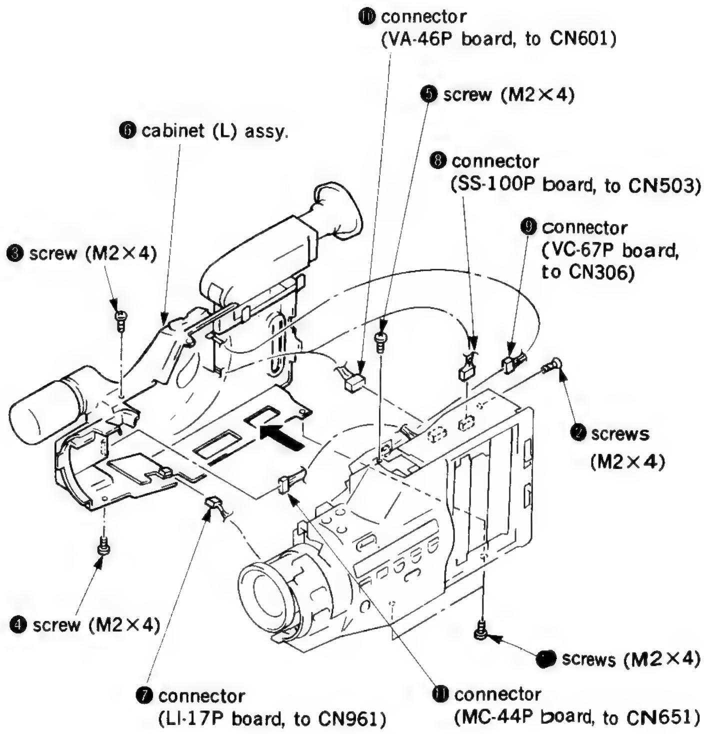
2-2. REMOVAL OF VTR PANEL (M) ASSY



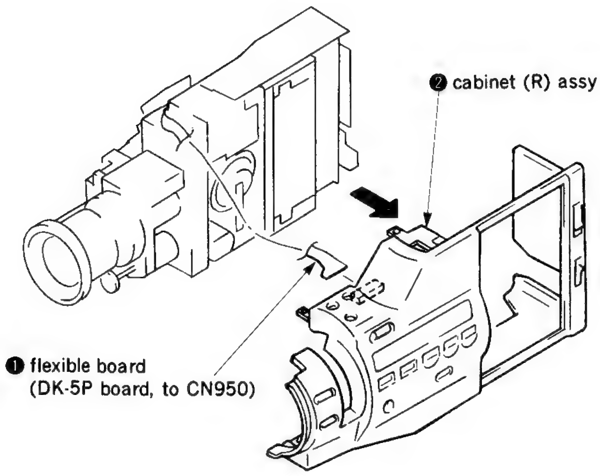
2-3. REMOVAL OF LENS HOOP



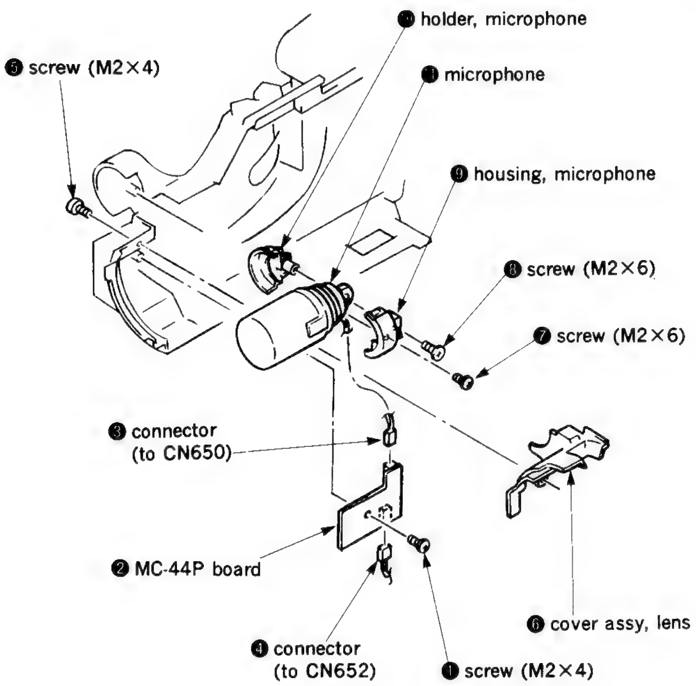
2-4. REMOVAL OF CABINET (L) ASSY



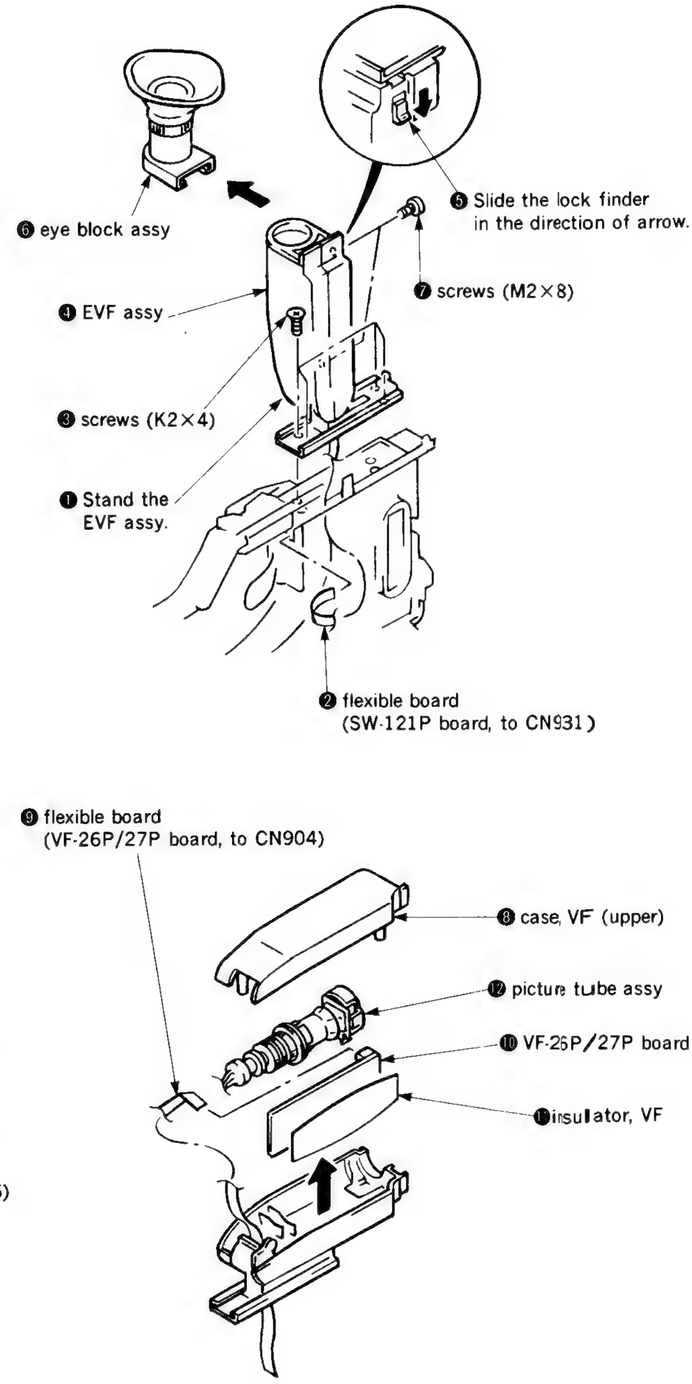
2-5. REMOVAL OF CABINET (R) ASSY



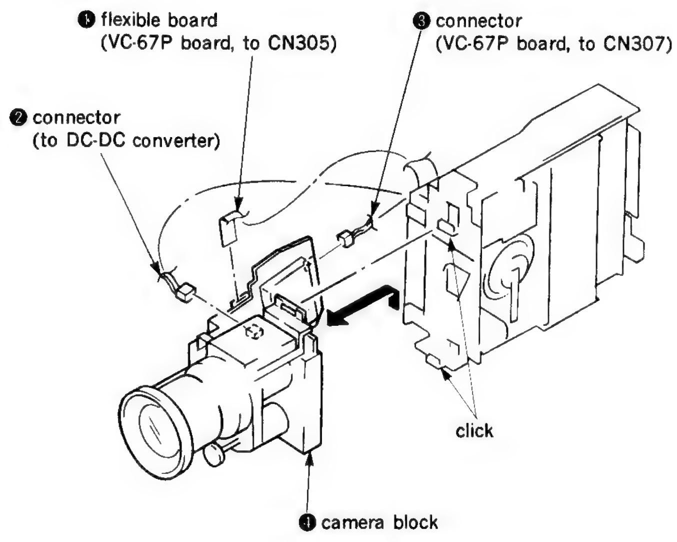
2-6. REMOVAL OF MICROPHONE (MC-44P BOARD)



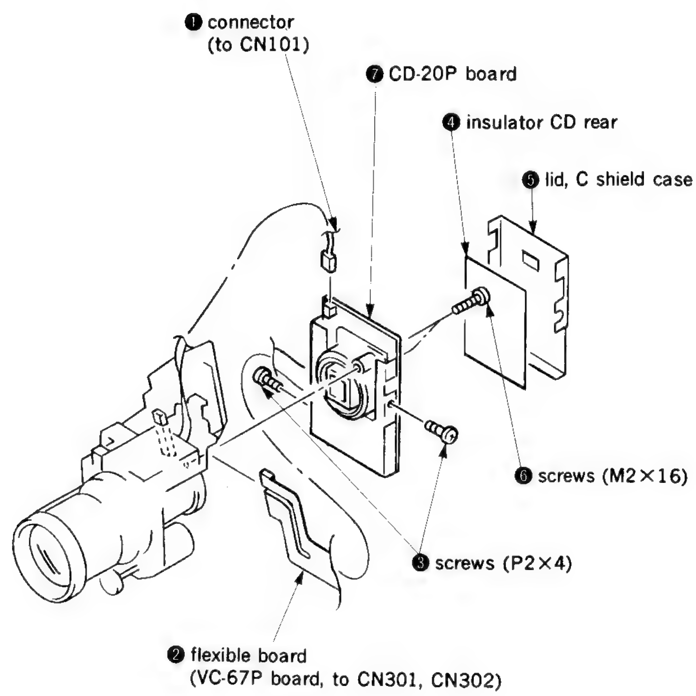
2-7. REMOVAL OF EVF ASSY

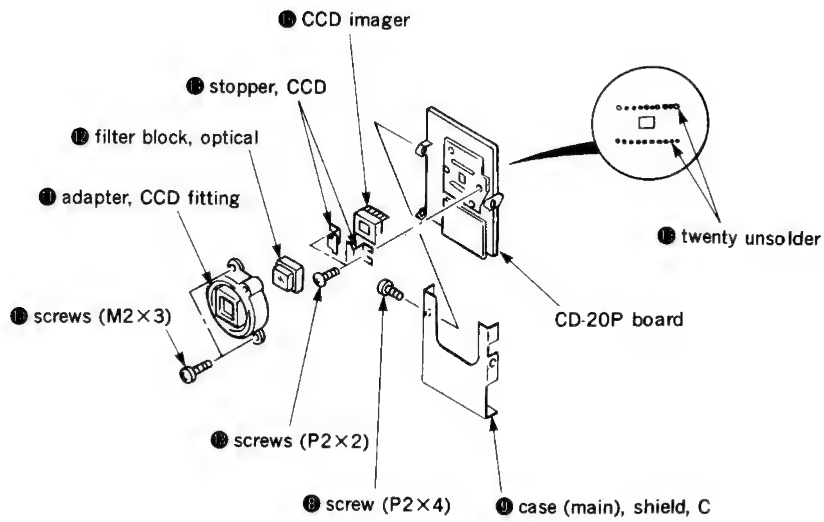


2-8. REMOVAL OF CAMERA BLOCK



2-9. REMOVAL OF CCD IMAGER (CD-20P BOARD)



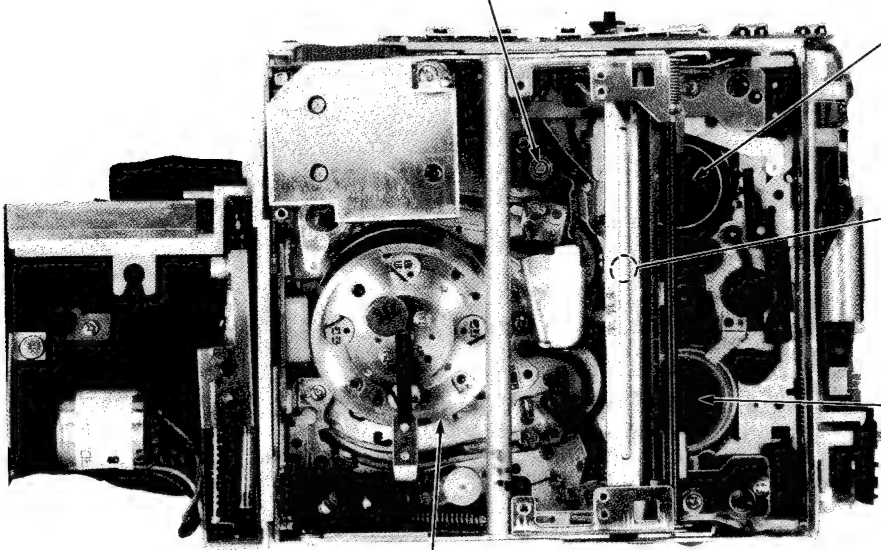


2-13. INTERNAL VIEWS

— Upper —

ARM block assy, pinch
A-7040-219-A

Table assy, reel, take-up
X-3728-855-1



Tape top/Tape end LED
(GL-452S)
8-719-940-81

Table assy, reel, supply
X-3728-851-1

Drum

Drum ASSY (DGU-63A-R)	A-7048-404-A
Drum upper (DGR-63-R)	A-7049-342-A

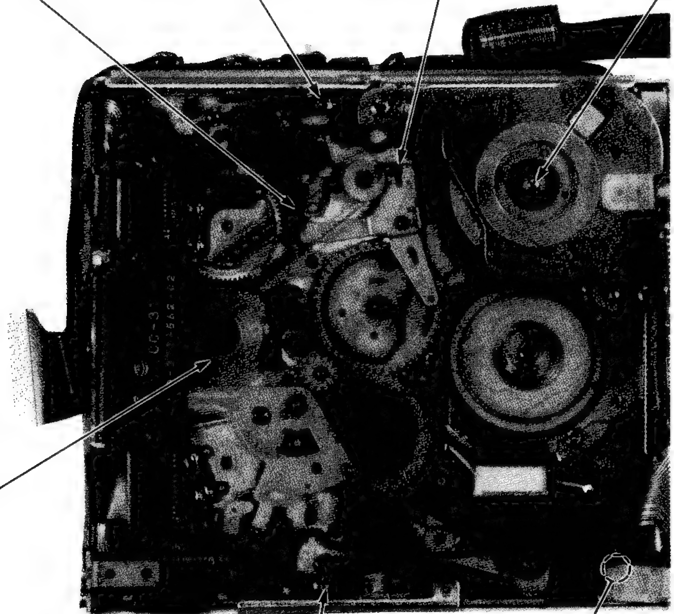
— Lower —

Belt (L), timing
3-741-197-01

Tape top sensor (EE-TP109)
8-729-906-48

Belt (S), timing
3-728-866-11

Motor, capstan (M902)
8-835-331-01

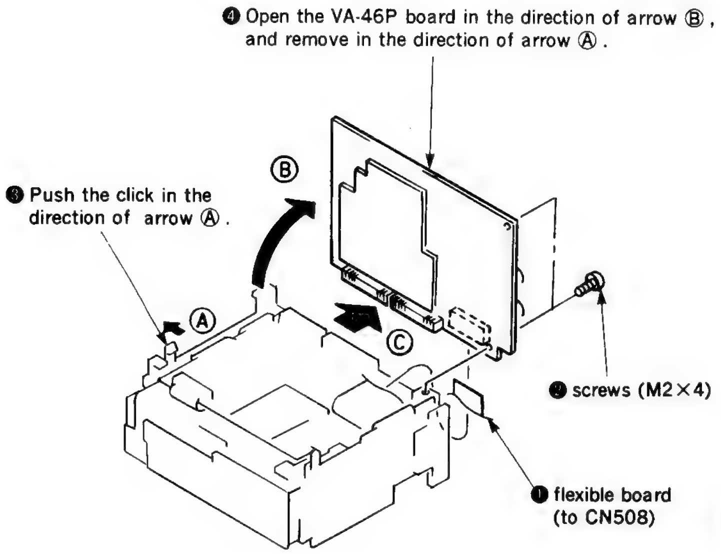


Gear assy, RK
X-3728-866-1

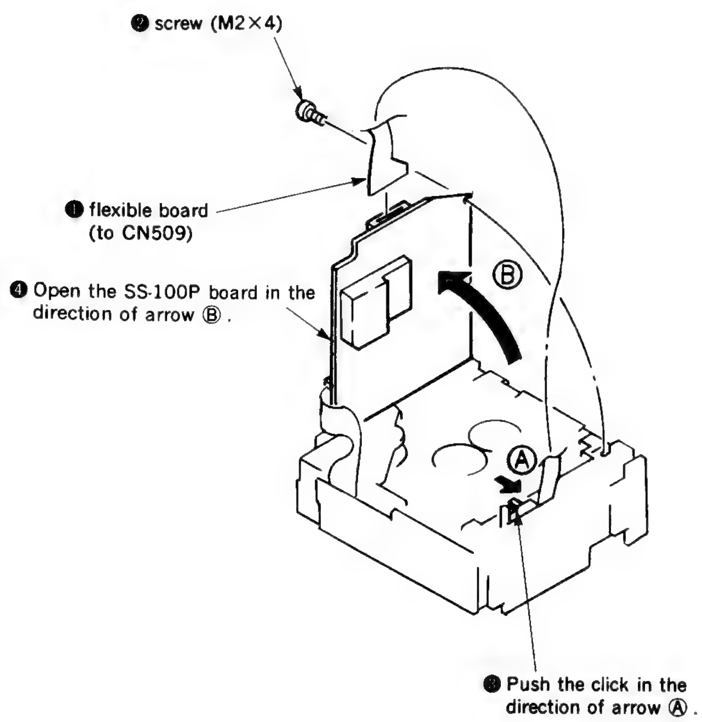
Tape end sensor
(EE-TP109)
8-729-906-48

Motor assy, loading (M903)
A-7040-208-A

2-10. REMOVAL OF VA-46P BOARD

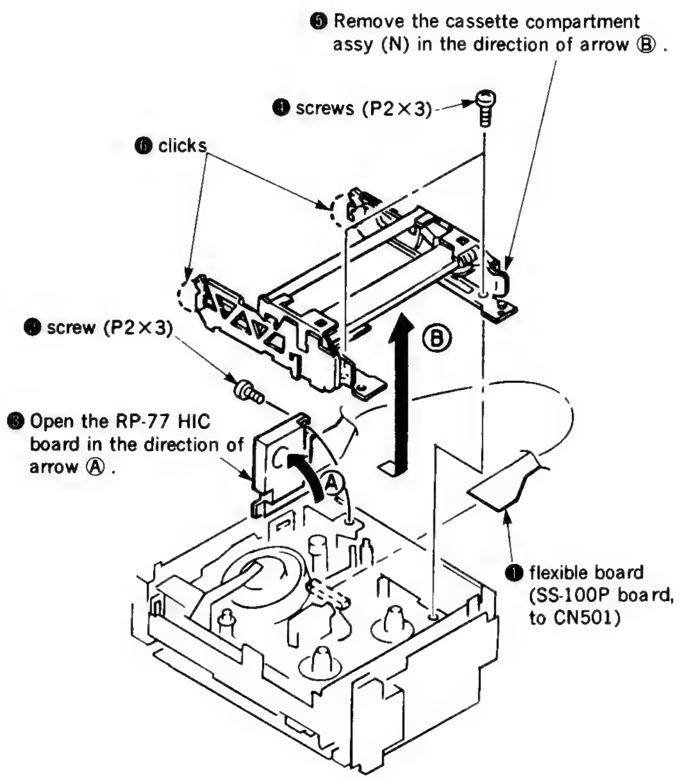


2-11. REMOVAL OF SS-100P BOARD



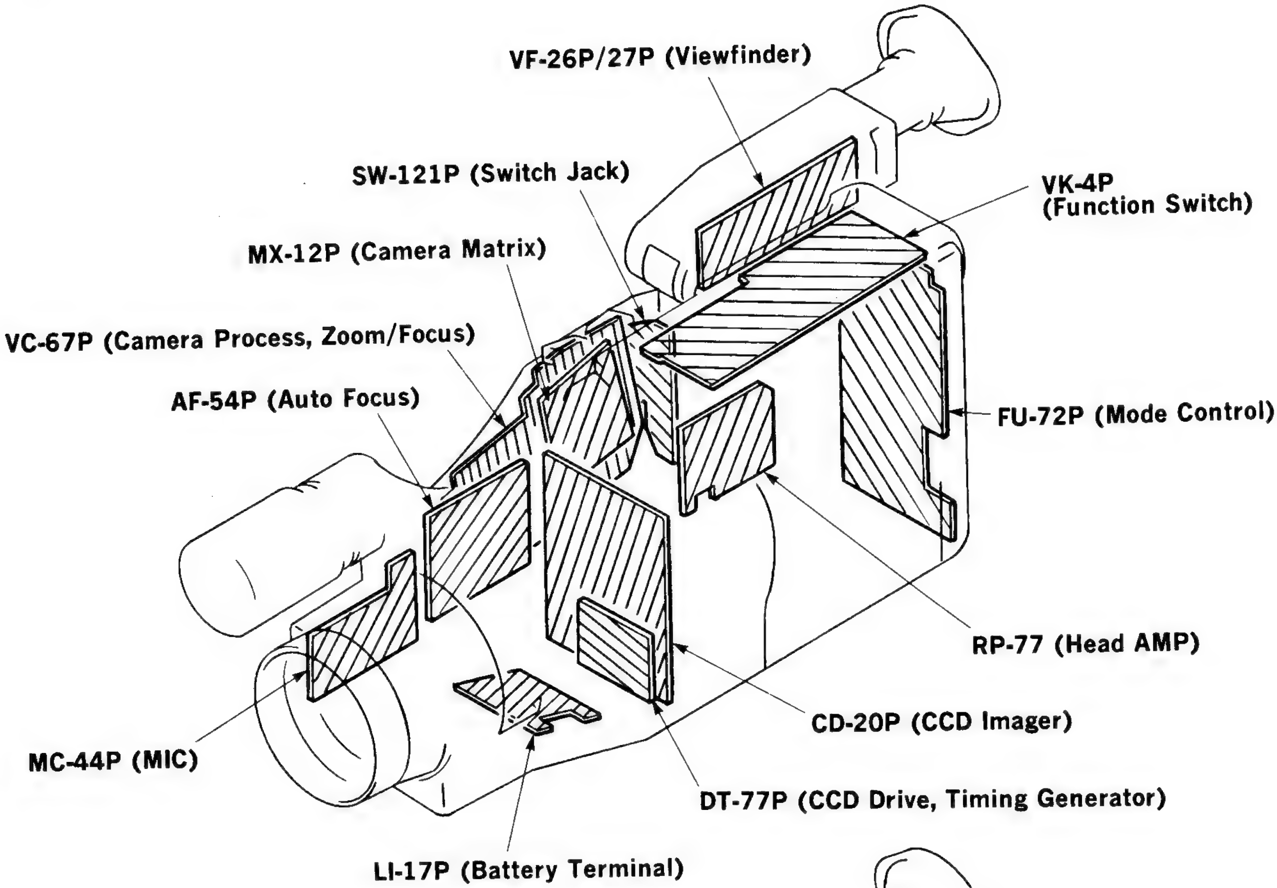
2-12. REMOVAL OF CASSETTE COMPARTMENT ASSEMBLY (N)

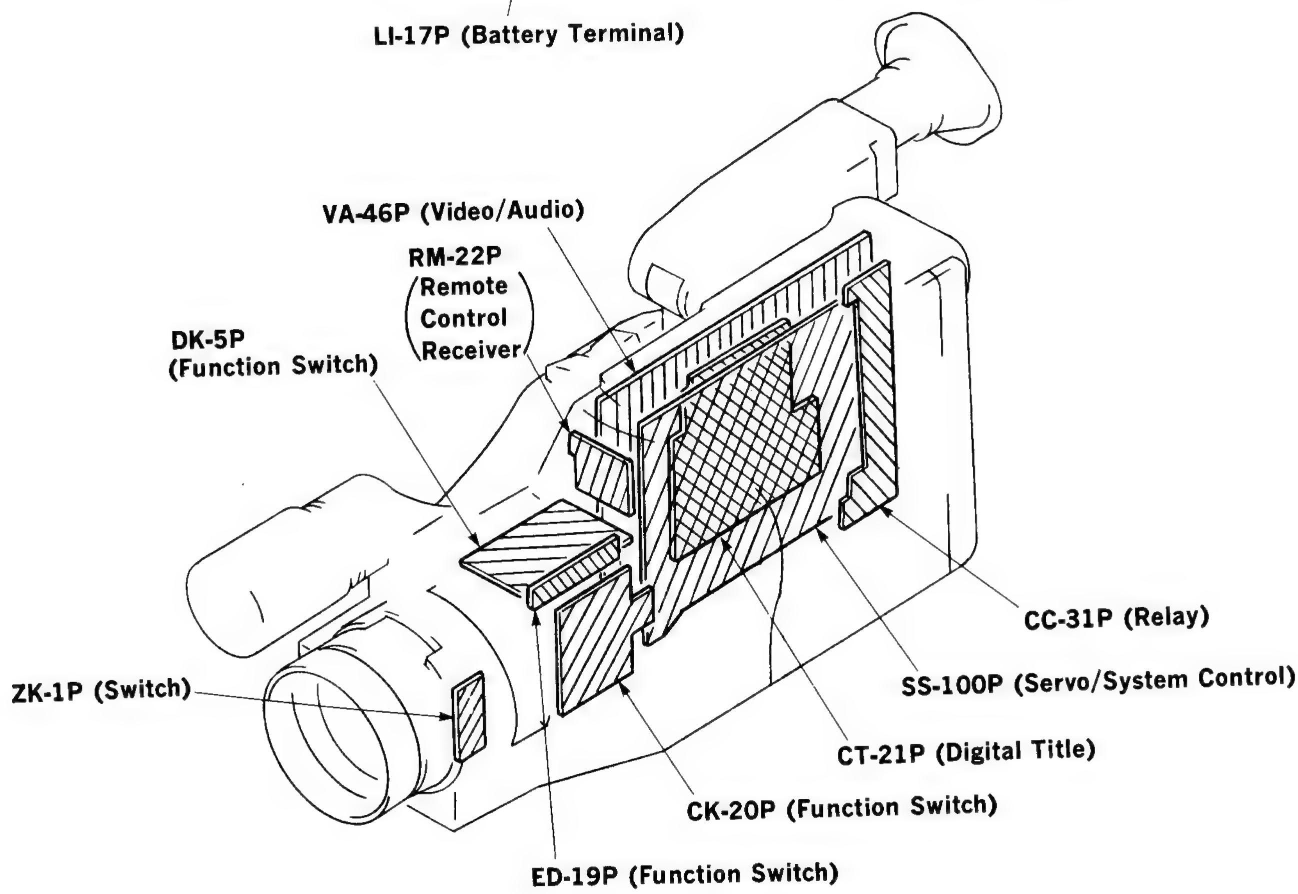
Note: When mounting, fit the clicks ❻ into completely, then clamp two screws ❹.



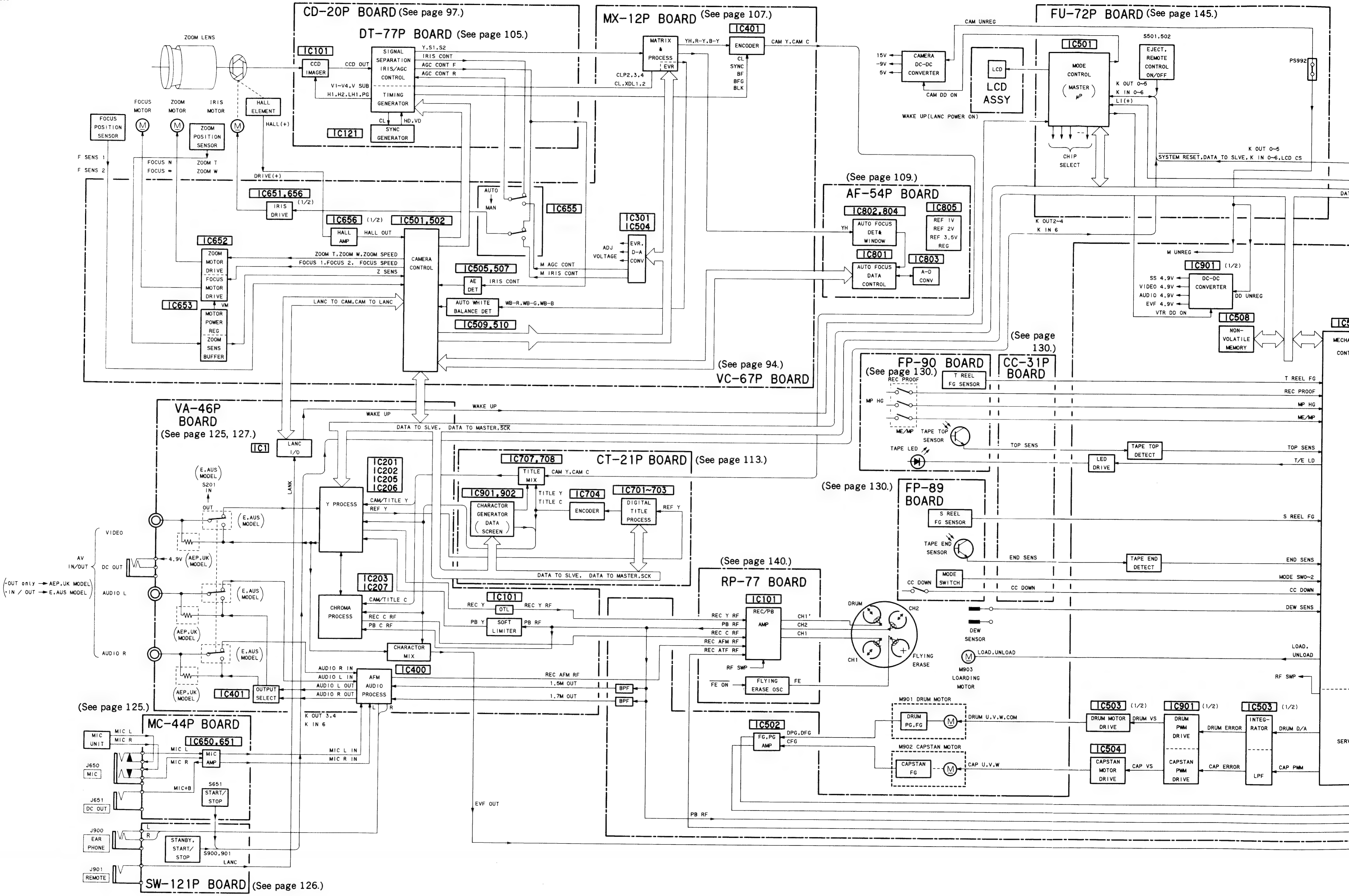
SECTION 3
DIAGRAMS

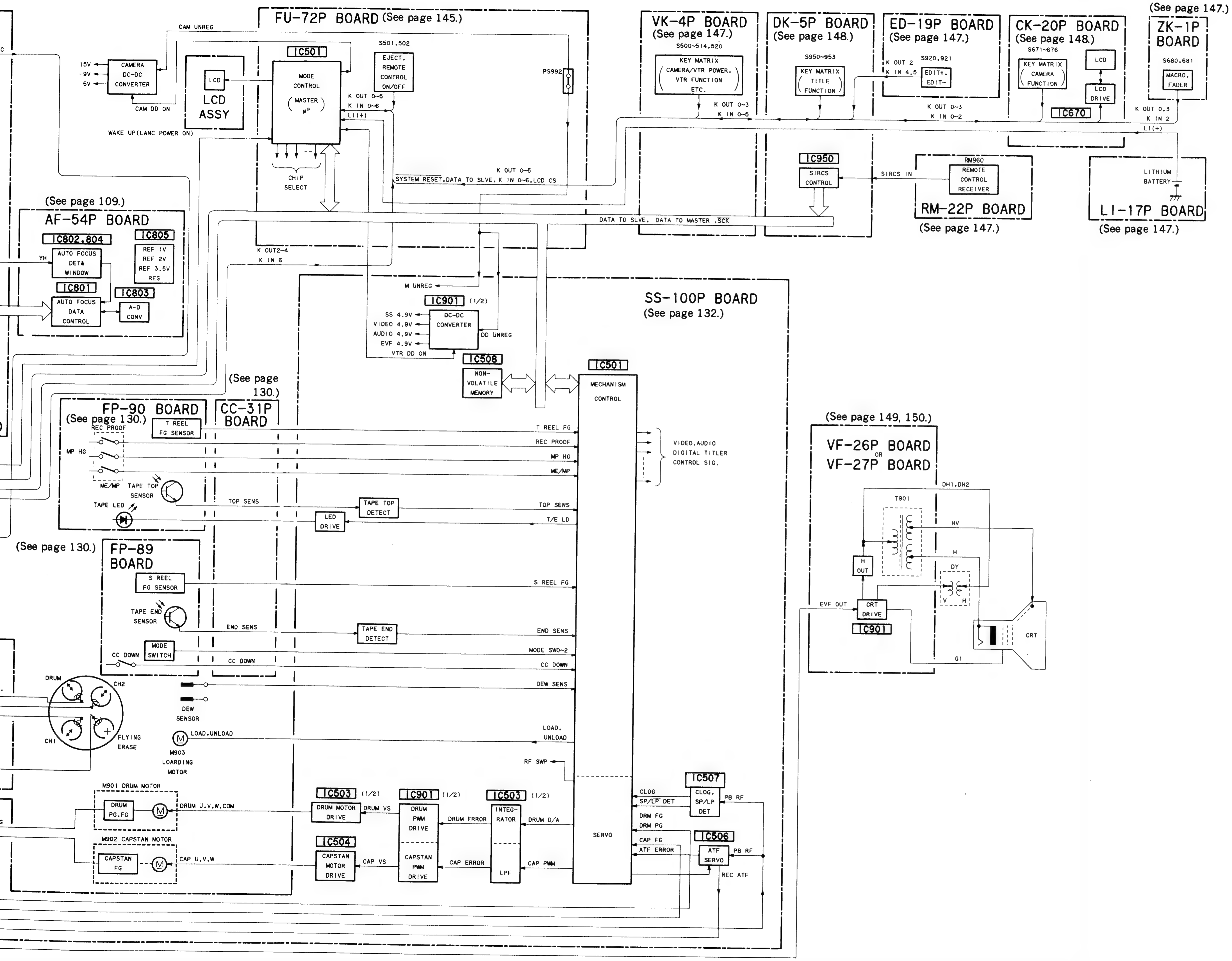
3-1. CIRCUIT BOARDS LOCATION



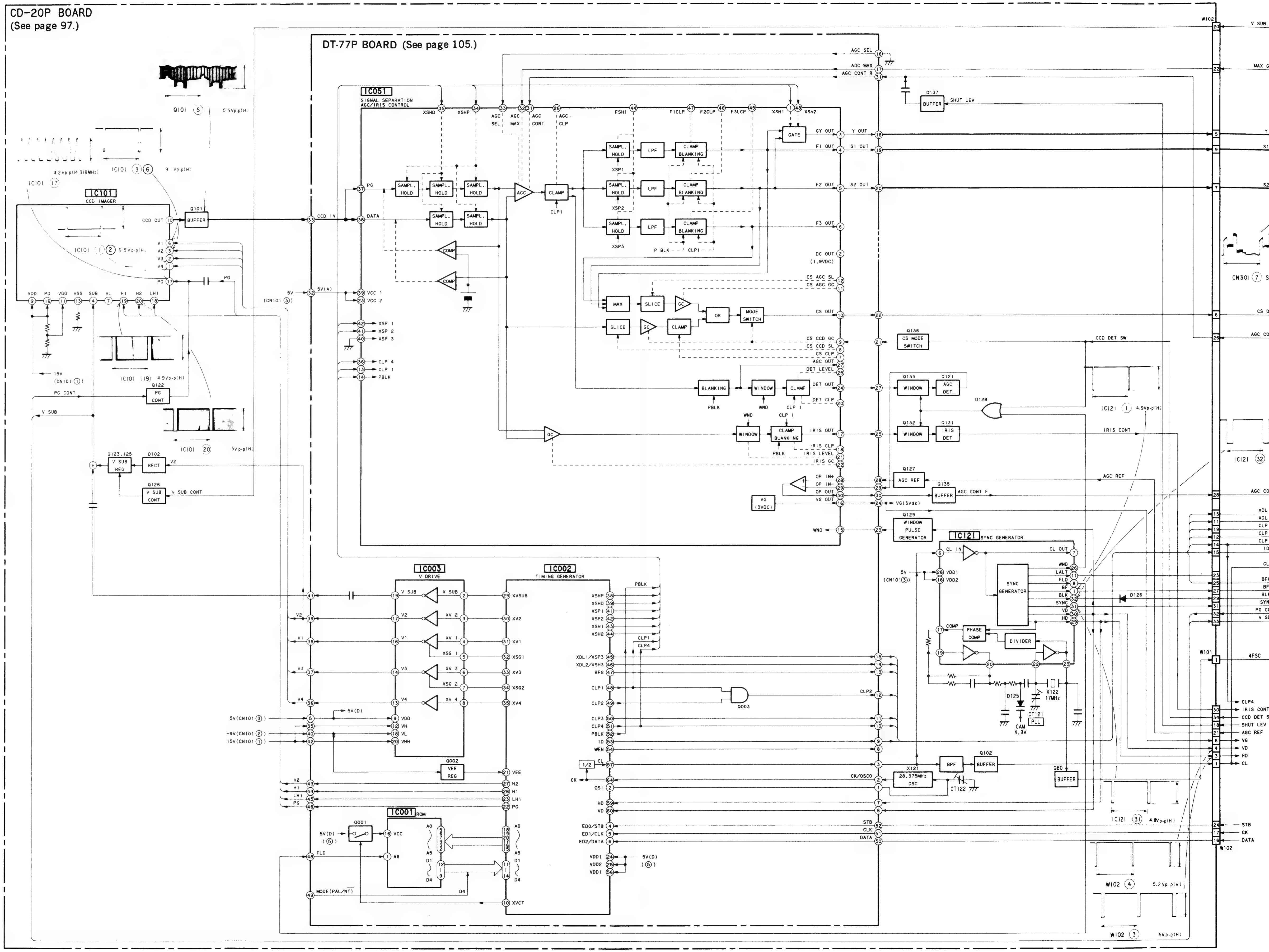


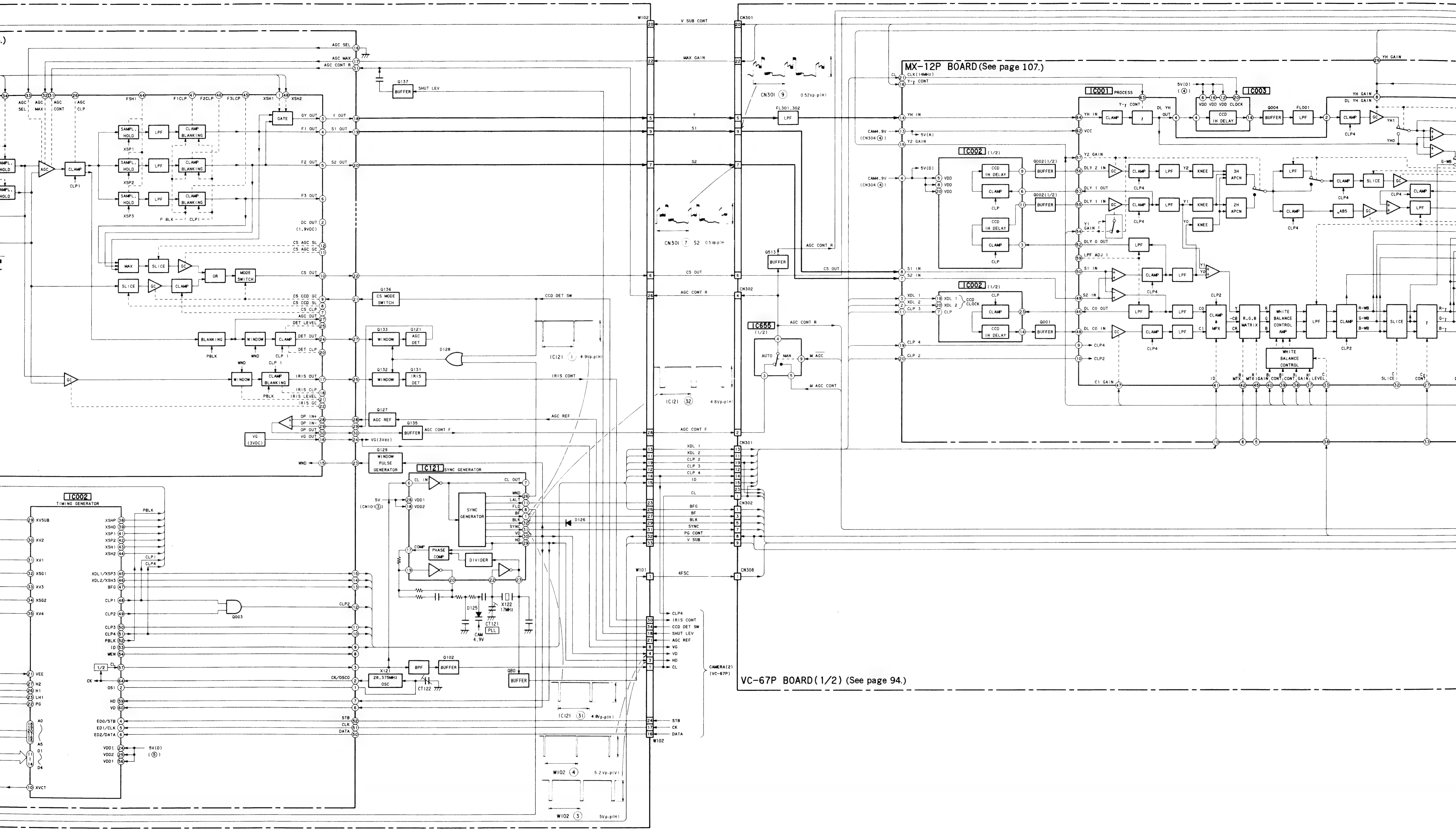
3-2. OVERALL BLOCK DIAGRAM



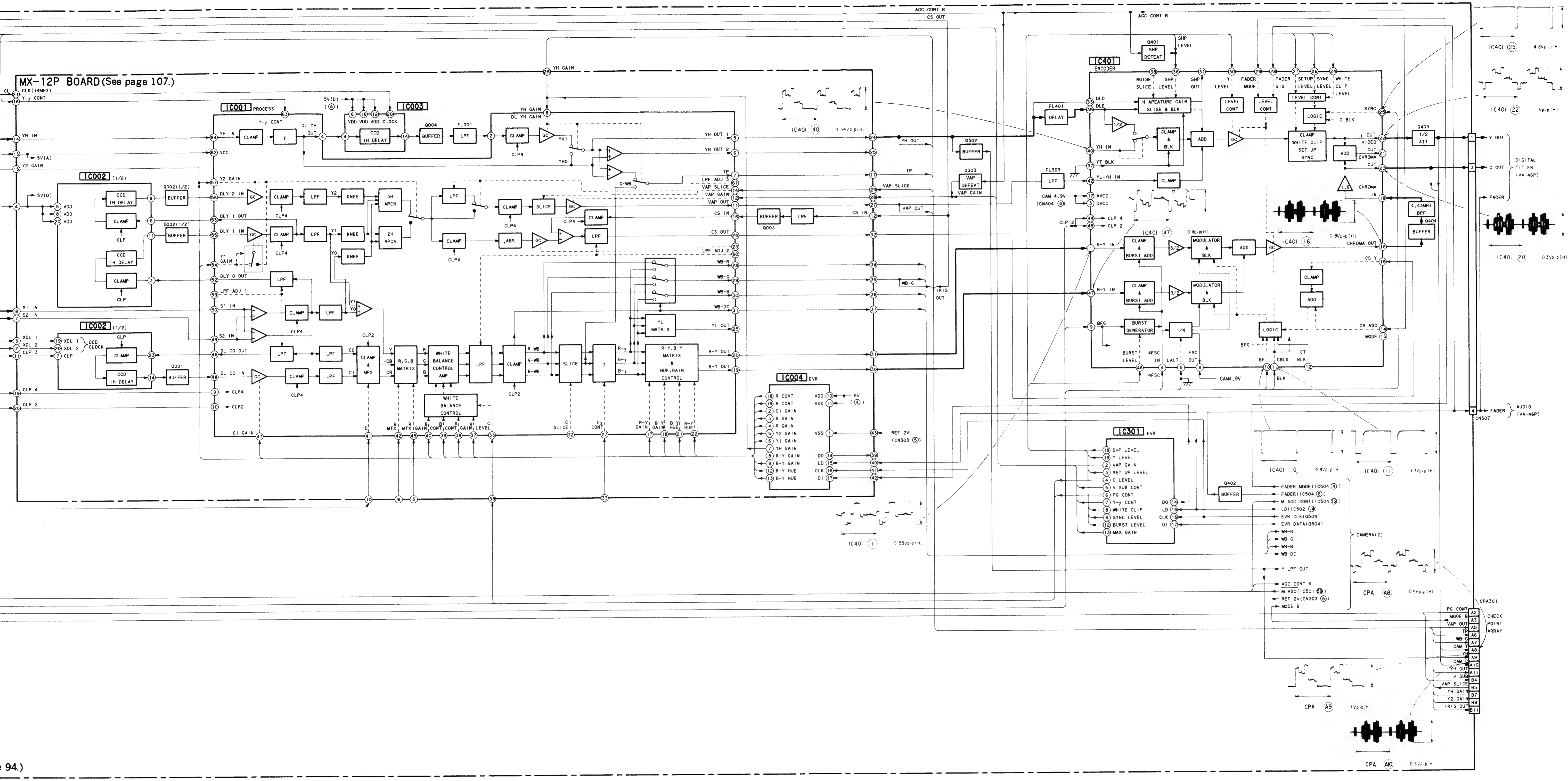

FU-72P BOARD (See page 145.)
IC501
MODE CONTROL (MASTER µP)
LCD
LCD ASSY
CAMERA DC-DC CONVERTER
15V
-9V
5V
CAM UNREG
CAM DD ON
WAKE UP(LANC POWER ON)
S501,502
EJECT, REMOTE CONTROL ON/OFF
PS992
K OUT 0-6
K IN 0-6
LI(+)
CHIP SELECT
SYSTEM RESET,DATA TO SLVE,K IN 0-6,LCD CS
DATA TO SLVE, DATA TO MASTER ,SCK
K OUT2-4
K IN 6
VK-4P BOARD (See page 147.)
S500-514,520
KEY MATRIX CAMERA/VTR POWER, VTR FUNCTION ETC.
K OUT 0-3
K IN 0-6
DK-5P BOARD (See page 148.)
S950-953
KEY MATRIX TITLE FUNCTION
IC950
SIRCS CONTROL
SIRCS IN
ED-19P BOARD (See page 147.)
S920,921
EDIT+, EDIT-
K OUT 2
K IN 4,5
K OUT 0-3
K IN 0-2
CK-20P BOARD (See page 148.)
S671-676
KEY MATRIX CAMERA FUNCTION
LCD
LCD DRIVE
IC670
(See page 147.)
ZK-1P BOARD
S680,681
MACRO, FADER
K OUT 0,3
K IN 2
LI(+)
RM960
REMOTE CONTROL RECEIVER
RM-22P BOARD
(See page 147.)
LITHIUM BATTERY
LI-17P BOARD
(See page 147.)
(See page 109.)
AF-54P BOARD
IC802,804
AUTO FOCUS DET& WINDOW
IC805
REF 1V REF 2V REF 3.5V REG
IC801
AUTO FOCUS DATA CONTROL
IC803
A-D CONV
YH
SS-100P BOARD
(See page 132.)
M UNREG
IC901 (1/2)
DC-DC CONVERTER
SS 4.9V
VIDEO 4.9V
AUDIO 4.9V
EVF 4.9V
VTR DD ON
DD UNREG
IC508
NON-VOLATILE MEMORY
IC501
MECHANISM CONTROL
SERVO
VIDEO,AUDIO DIGITAL TITLER CONTROL SIG.
(See page 130.)
CC-31P BOARD
FP-90 BOARD (See page 130.)
T REEL FG SENSOR
REC PROOF
MP HG
ME/MP
TAPE TOP SENSOR
TAPE LED
TOP SENS
TAPE TOP DETECT
LED DRIVE
T REEL FG
TOP SENS
T/E LD
(See page 130.)
FP-89 BOARD
S REEL FG SENSOR
TAPE END SENSOR
END SENS
TAPE END DETECT
MODE SWITCH
CC DOWN
S REEL FG
END SENS
MODE SWO-2
DEW SENS
DEW SENSOR
DRUM
CH1
CH2
FLYING ERASE
M903 LOADING MOTOR
LOAD,UNLOAD
RF SWP
M901 DRUM MOTOR
DRUM PG,FG
DRUM U,V,W,COM
M902 CAPSTAN MOTOR
CAPSTAN FG
CAP U,V,W
IC503 (1/2)
DRUM MOTOR DRIVE
DRUM VS
IC901 (1/2)
DRUM PWM DRIVE
CAPSTAN PWM DRIVE
DRUM ERROR
CAP ERROR
IC503 (1/2)
INTEG-RATOR
LPF
DRUM D/A
CAP PWM
IC504
CAPSTAN MOTOR DRIVE
CAP VS
IC507
CLOG, SP/LP DET
CLOG
SP/LP DET
PB RF
DRM FG
DRM PG
CAP FG
ATF ERROR
IC506
ATF SERVO
REC ATF
(See page 149, 150.)
VF-26P BOARD OR VF-27P BOARD
DH1,DH2
T901
HV
H
DY
H OUT
CRT DRIVE
IC901
EVF OUT
CRT
G1

3-3. CAMERA (1) BLOCK DIAGRAM





MX-12P BOARD (See page 107.)
VC-67P BOARD (1/2) (See page 94.)
IC002 TIMING GENERATOR
IC121 SYNC GENERATOR
IC001 PROCESS
IC003
IC002 (1/2)
IC655 (1/2)
CAMERA(2) (VC-67P)



MX-12P BOARD (See page 107.)
IC001 PROCESS
IC002 (1/2)
IC003
IC004 EVR
IC401 ENCODER
IC301 EVR
DIGITAL TITLER (VA-46P)
AUDIO (VA-46P)
CN307
CHECK POINT ARRAY
CPA301
94.)

3-4. CAMERA SYSTEM CONTROL VC-67P BOARD IC501 (MC68HC11E9)

〔Description〕

MC68HC11E9 is a 8-bit one-chip micro controller with a built-in nonvolatile memory (EEPROM). All the camera system, which has been composed by mere than one, can be controlled by only this micro controller. In addition, protocol master control of the LANC communication can be performed.

1. Function

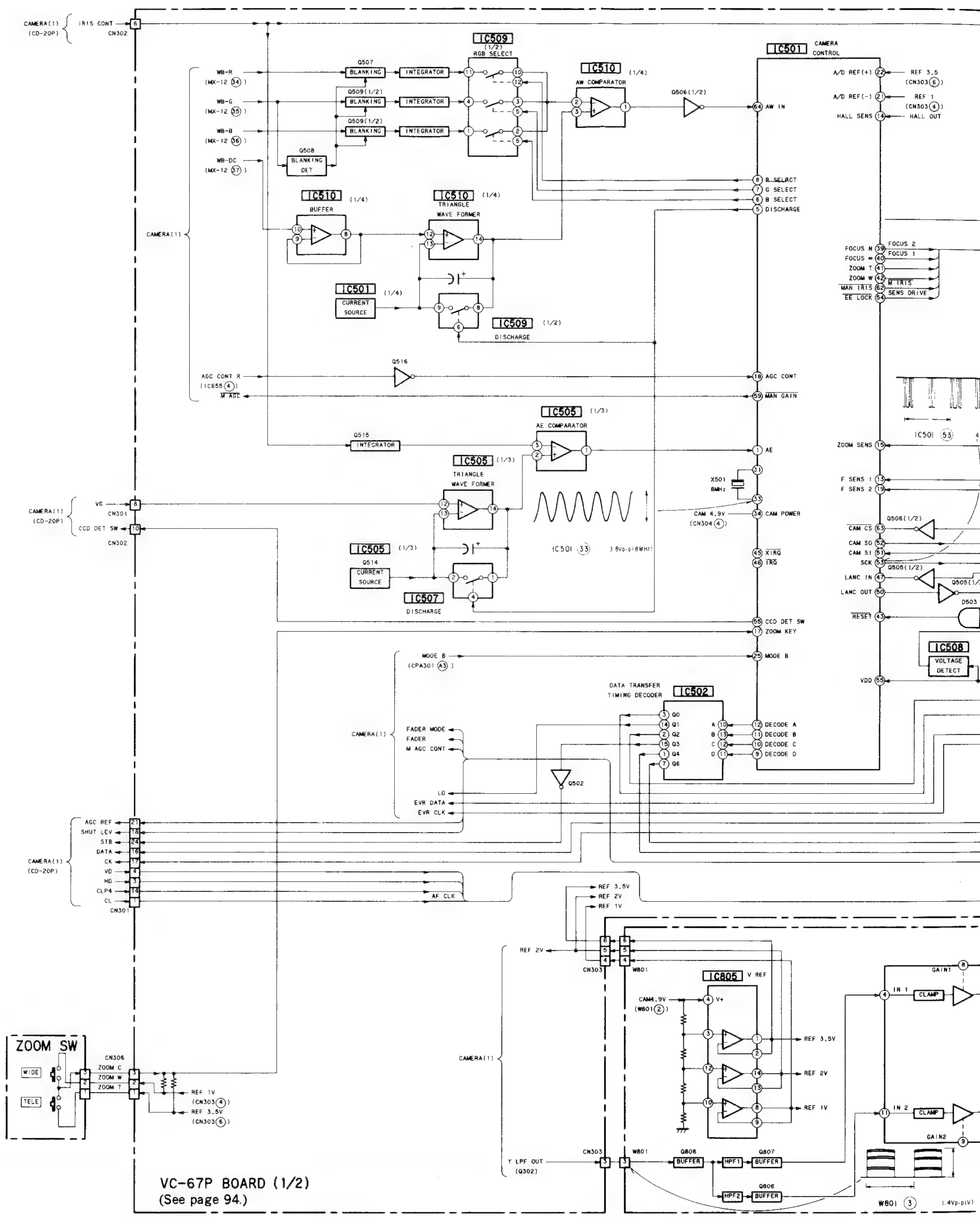
1) EVR Control
2) AWB Control
3) AE Control
4) AF Control
5) LANC communication protocol control

2. Pin Description

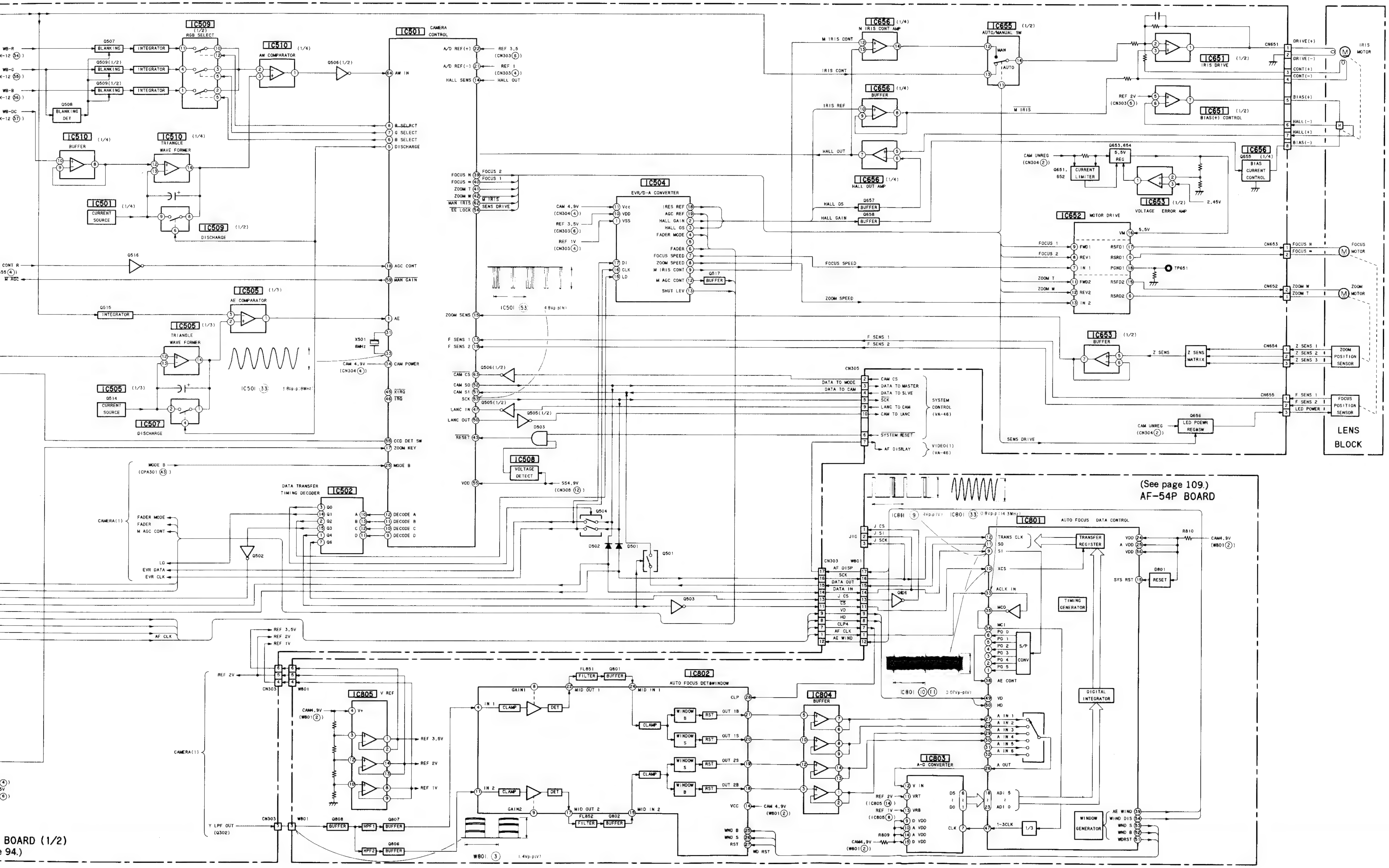
PIN No.	PIN Name	I/O	Function
1	AE	I	AE Integration-type A/D converter comparator input
2	NC	—	——
3	NC	—	——
4	NC	—	——
5	DISCHG	O	AWB. AE Integration-type A/D reset pulse
6	B SELECT	O	AWB Instrumentation line select pulse (blue)
7	G SELECT	O	AWB Instrumentation line select pulse (green)
8	R SELECT	O	AWB Instrumentation line select pulse (red)
9	DECODE D	O	Decode 4 to 10 and expand port with outside IC (4208)
10	DECODE C	O	Decode 4 to 10 and expand port with outside IC (4208)
11	DECODE B	O	Decode 4 to 10 and expand port with outside IC (4208)
12	DECODE A	O	Decode 4 to 10 and expand port with outside IC (4208)
13	F SENS1	I	Focus sensor 1 voltage entrance (Analog input)
14	HALL SENS	I	Hall element voltage input (Analog input)
15	ZOOM SENS	I	Zoom position detection voltage input (Analog input)
16	AN5	I	NC Not used
17	ZOOM KEY	I	Zoom switch voltage input (Analog input)
18	AGC CONT	I	AGC voltage input (Analog input)
19	F SENS2	I	Focus sensor 2 voltage input (Analog input)
20	AN7	I	NC Not used
21	A/D REF(−)	—	Built-in A/D converter the minimum standard voltage (Analog input)
22	A/D REF(+)	—	Built-in A/D converter the minimum standard voltage (Analog input)
23	V_{SS}	—	GND
24	V_{SS}	—	GND
25	MODE B	I	Pull up to SS4.9V
26	NC	—	——
27	MODA	I	Pull down to GND
28	STR A	—	NC Not used
29	E	—	NC Not used
30	STR B	—	NC Not used
31	EXTAL	O	Built-in inverter output for oscillating element
32	NC	—	——

PIN No.	PIN Name	I/O	Function
33	XTAL	I	Built-in inverter input for oscillating element
34	CAM POWER	I	Camera power source rise supervision
35	NC	—	——
36	PC1	—	NC
37	PC2	I	Pull up to SS4.9V
38	PC3	—	NC
39	FOCUS N	O	Focus motor N-direction rotating designation
40	FOCUS ∞	O	Focus motor ∞-direction rotating designation
41	ZOOM T	O	Zoom motor T-direction rotating designation
42	ZOOM W	O	Zoom motor W-direction rotating designation
43	$\overline{\text{RESET}}$	I	Reset
44	NC	—	——
45	$\overline{\text{XIRQ}}$	I	Pull up to SS4.9V
46	$\overline{\text{IRQ}}$	I	Pull up to SS4.9V
47	LANC IN	I	LANC input
48	NC	—	——
49	V_{SS}	—	GND
50	LANC OUT	O	LANC output
51	CAM SI	I	Serial data input
52	CAM SO	O	Serial data output
53	SCK	O	Serial clock
54	SENS DRIVE	O	AF sensor Luminous pulse output
55	V_{DD}	—	SS4.9V
56	PAI	—	NC
57	PA6	O	CCD DET switch select
58	OC3	—	NC
59	$\overline{\text{MAN GAIN}}$	O	AGC system automatic/manual select
60	NC	—	——
61	NC	—	——
62	$\overline{\text{MAN IRIS}}$	O	IRIS system automatic/manual select
63	$\overline{\text{CAM CS}}$	I	Camera chip select input
64	$\overline{\text{AW IN}}$	I	AWB Integration-type A/D converter comparator input

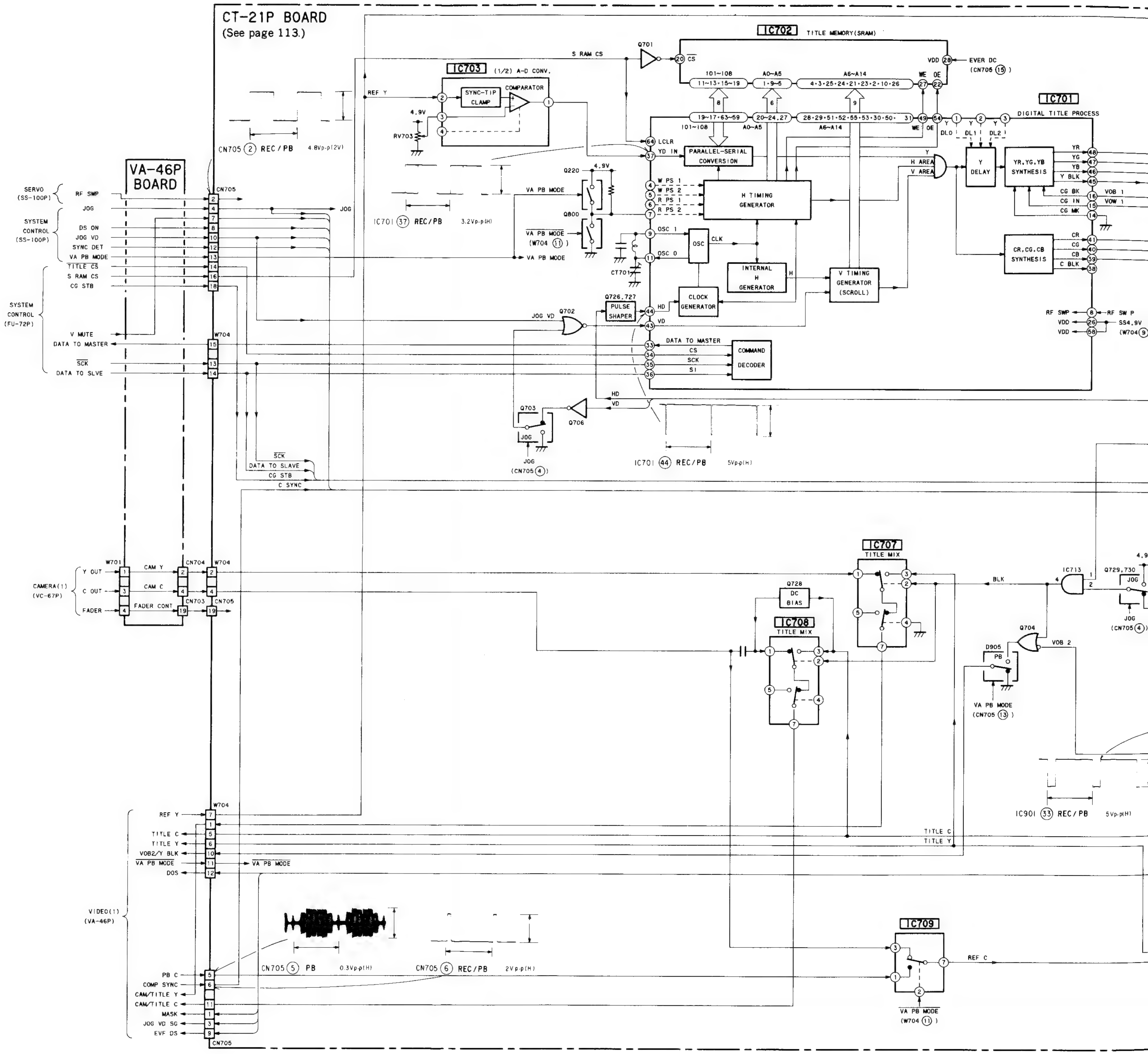
3-5. CAMERA (2) BLOCK DIAGRAM



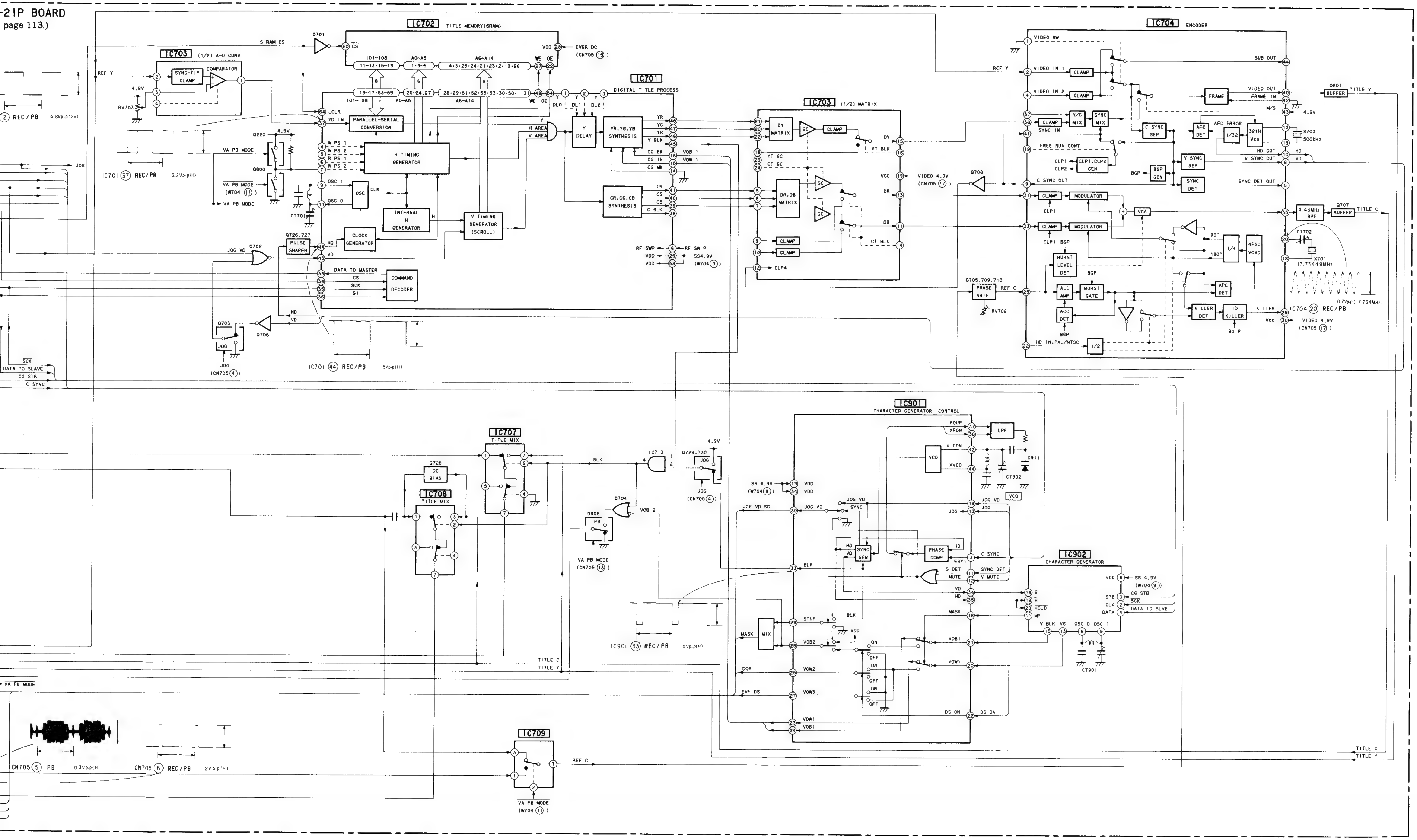
K DIAGRAM



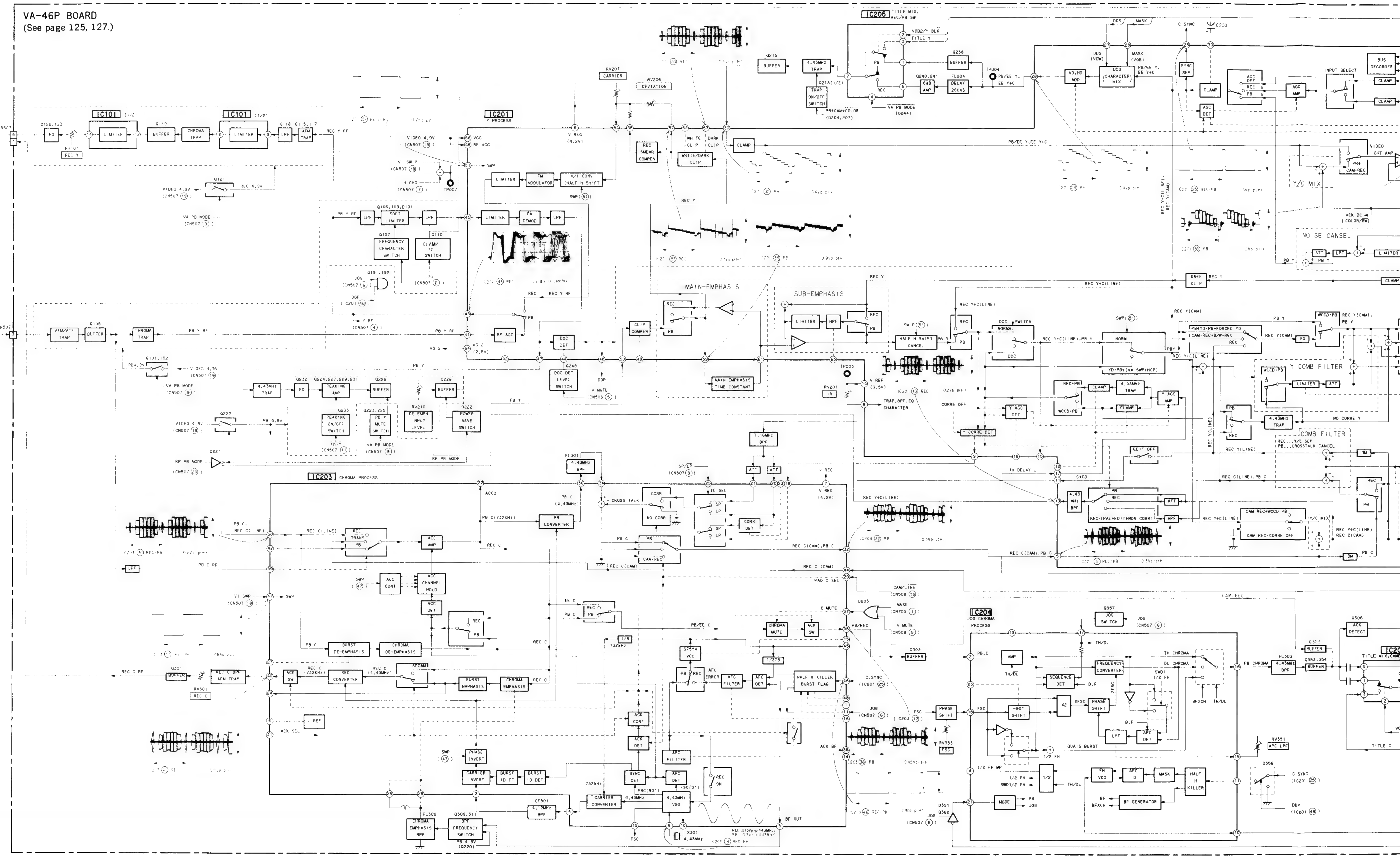
3-6. DIGITAL TITLER BLOCK DIAGRAM

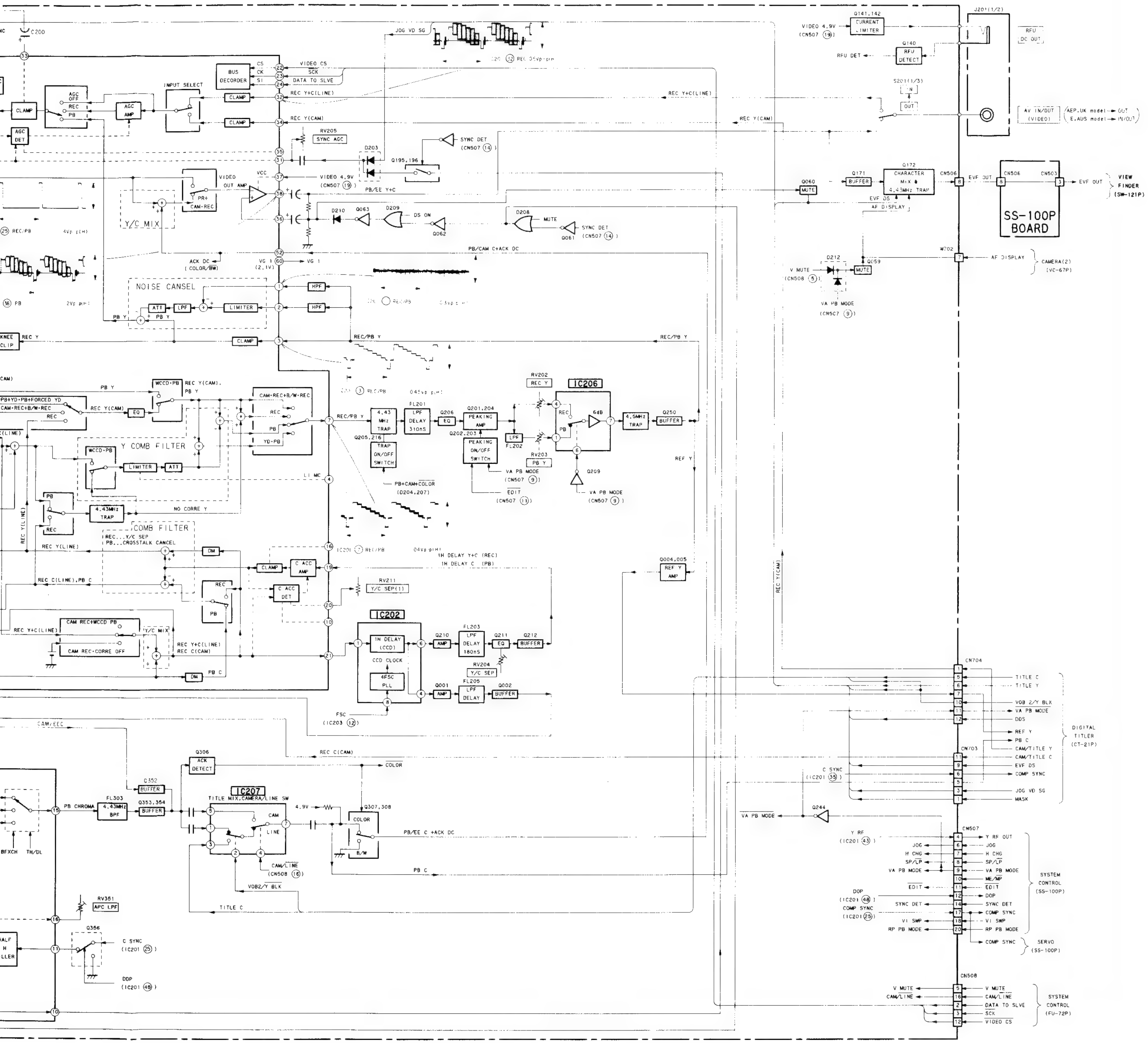


RAM

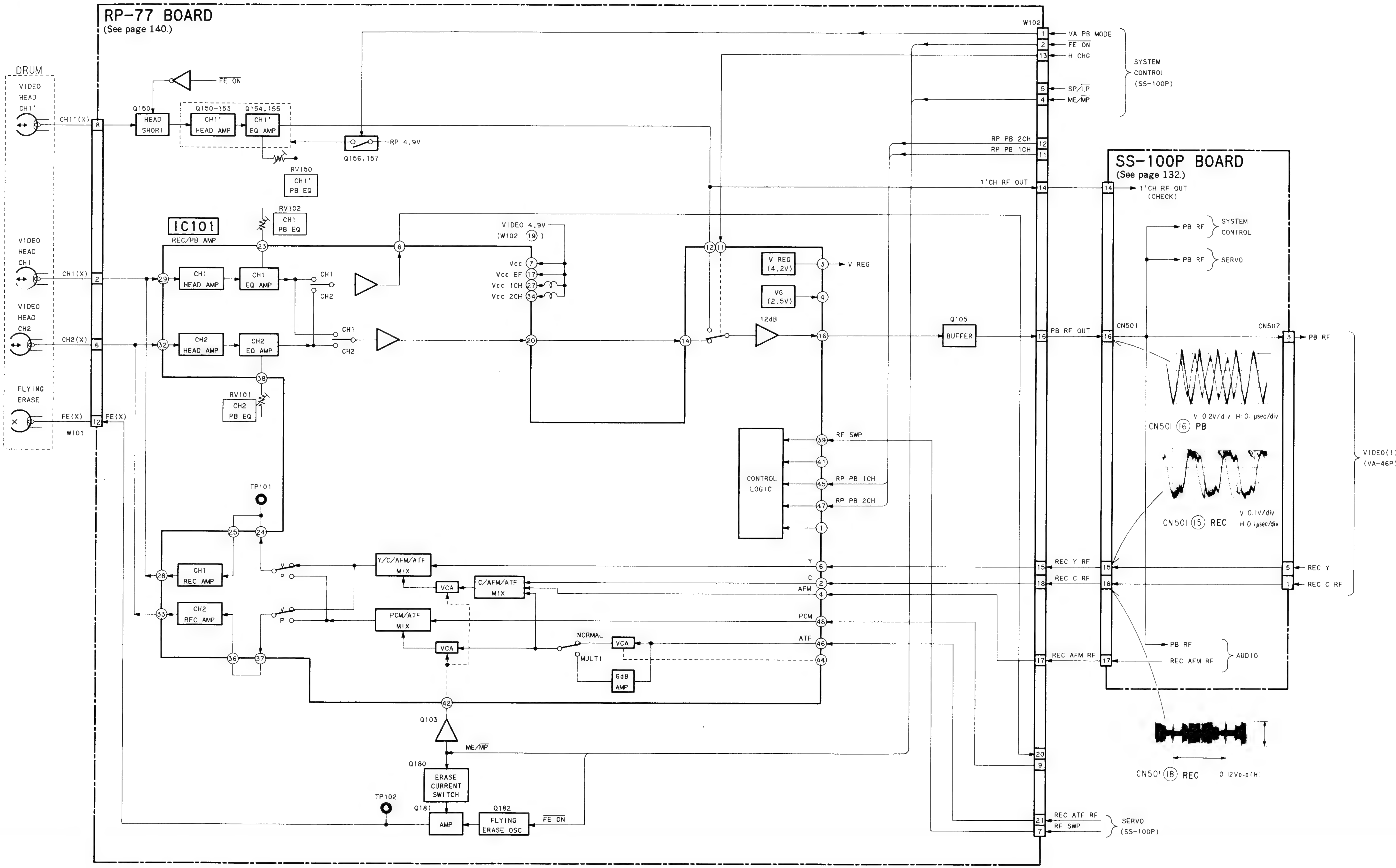

-21P BOARD
page 113.)
IC702 TITLE MEMORY(SRAM)
IC703 (1/2) A-D CONV.
SYNC-TIP CLAMP
COMPARATOR
IC701 DIGITAL TITLE PROCESS
PARALLEL-SERIAL CONVERSION
H TIMING GENERATOR
INTERNAL H GENERATOR
V TIMING GENERATOR (SCROLL)
CLOCK GENERATOR
PULSE SHAPER
COMMAND DECODER
Y DELAY
YR,YG,YB SYNTHESIS
CR,CG,CB SYNTHESIS
IC703 (1/2) MATRIX
DY MATRIX
DR,DB MATRIX
CLAMP
IC704 ENCODER
VIDEO SW
VIDEO IN 1
VIDEO IN 2
SUB OUT
VIDEO OUT
FRAME IN
FRAME
BUFFER
TITLE Y
TITLE C
Y/C MIX
SYNC MIX
C SYNC SEP
AFC DET
AFC ERROR
1/32
321H Vco
X703 500kHz
FREE RUN CONT
CLP1,CLP2 GEN
BGP GEN
V SYNC SEP
SYNC DET
C SYNC OUT
SYNC DET OUT
MODULATOR
VCA
4.43MHz BPF
Q707 BUFFER
1/4
4FSC VCXO
X701 17.734 48MHz
BURST LEVEL DET
ACC AMP
BURST GATE
ACC DET
APC DET
KILLER DET
ID KILLER
Q705,709,710 PHASE SHIFT
RV702
HD IN,PAL/NTSC
1/2
IC704 (20) REC/PB
0.7Vp-p(17.734MHz)
IC701 (37) REC/PB 3.2Vp-p(H)
IC701 (44) REC/PB 5Vp-p(H)
IC901 CHARACTER GENERATOR CONTROL
LPF
VCO
SYNC GEN
PHASE COMP
MIX
IC902 CHARACTER GENERATOR
CT901
CT902
D911
IC901 (33) REC/PB 5Vp-p(H)
IC707 TITLE MIX
IC708 TITLE MIX
Q728 DC BIAS
IC713
Q729,730
Q704
D905
IC709
REF C
VA PB MODE (W704 (11))
CN705 (5) PB 0.3Vp-p(H)
CN705 (6) REC/PB 2Vp-p(H)
(2) REC/PB 4.8Vp-p(2V)

3-7. VIDEO (1) BLOCK DIAGRAM

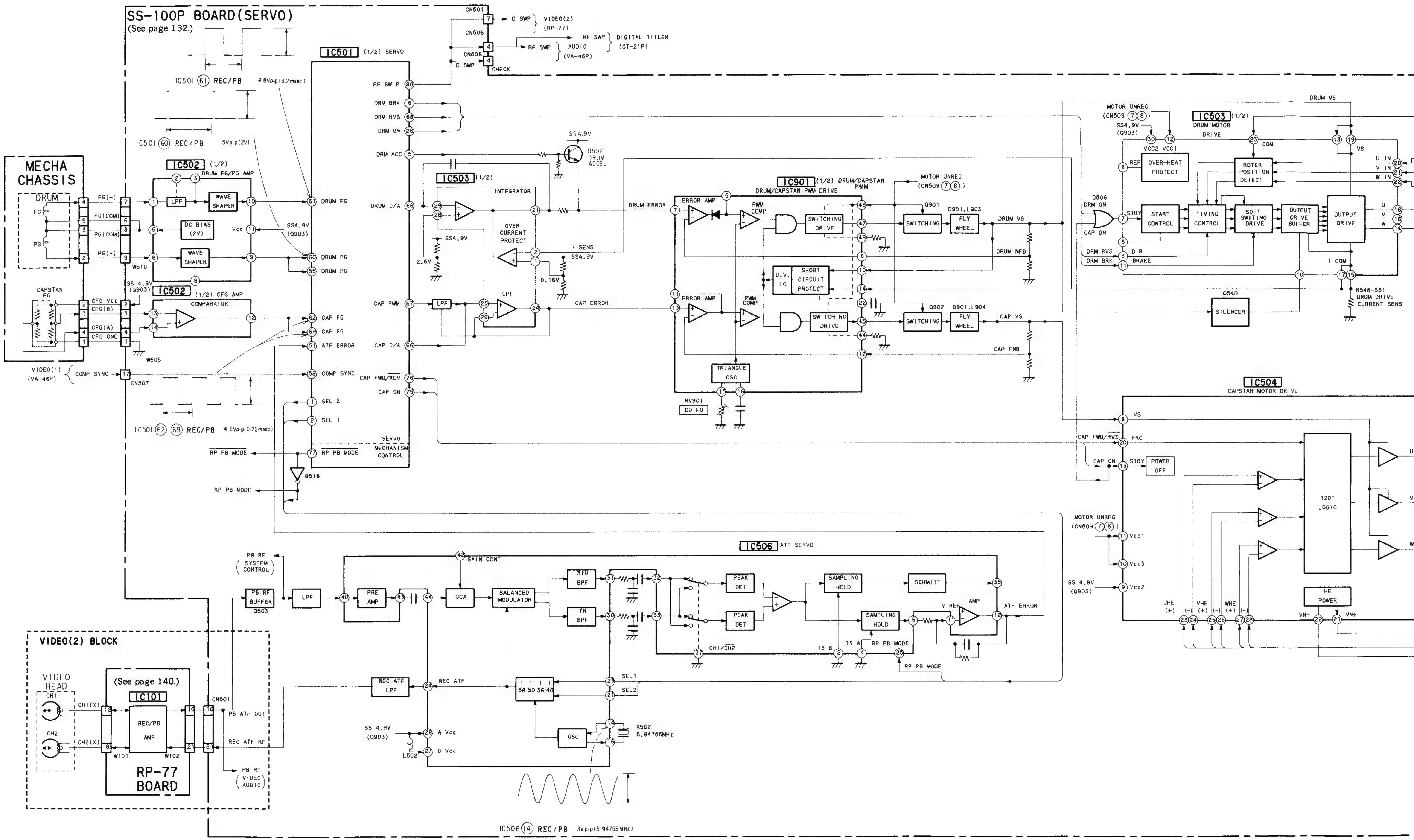


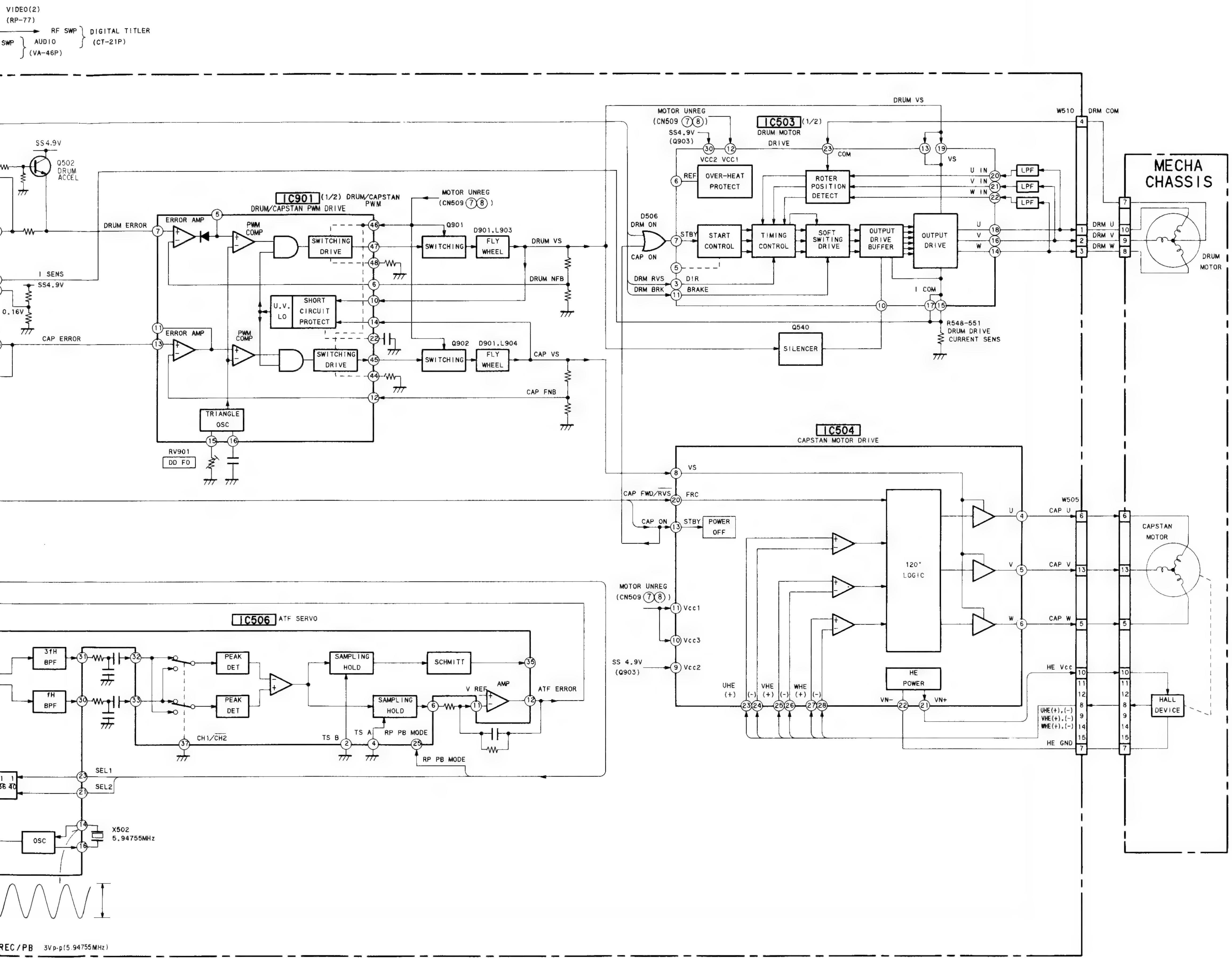


3-8. VIDEO (2) BLOCK DIAGRAM



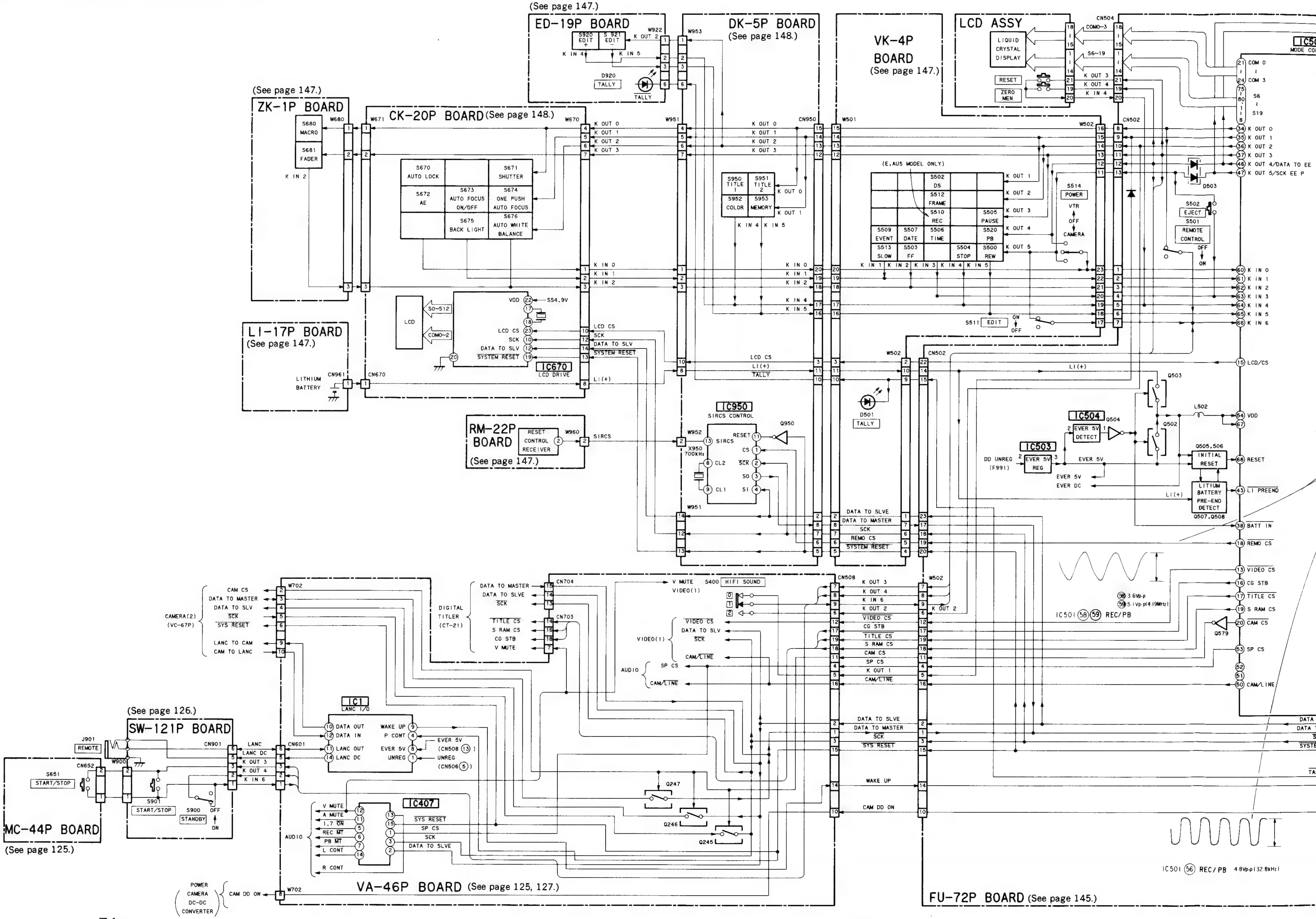
. SERVO BLOCK DIAGRAM

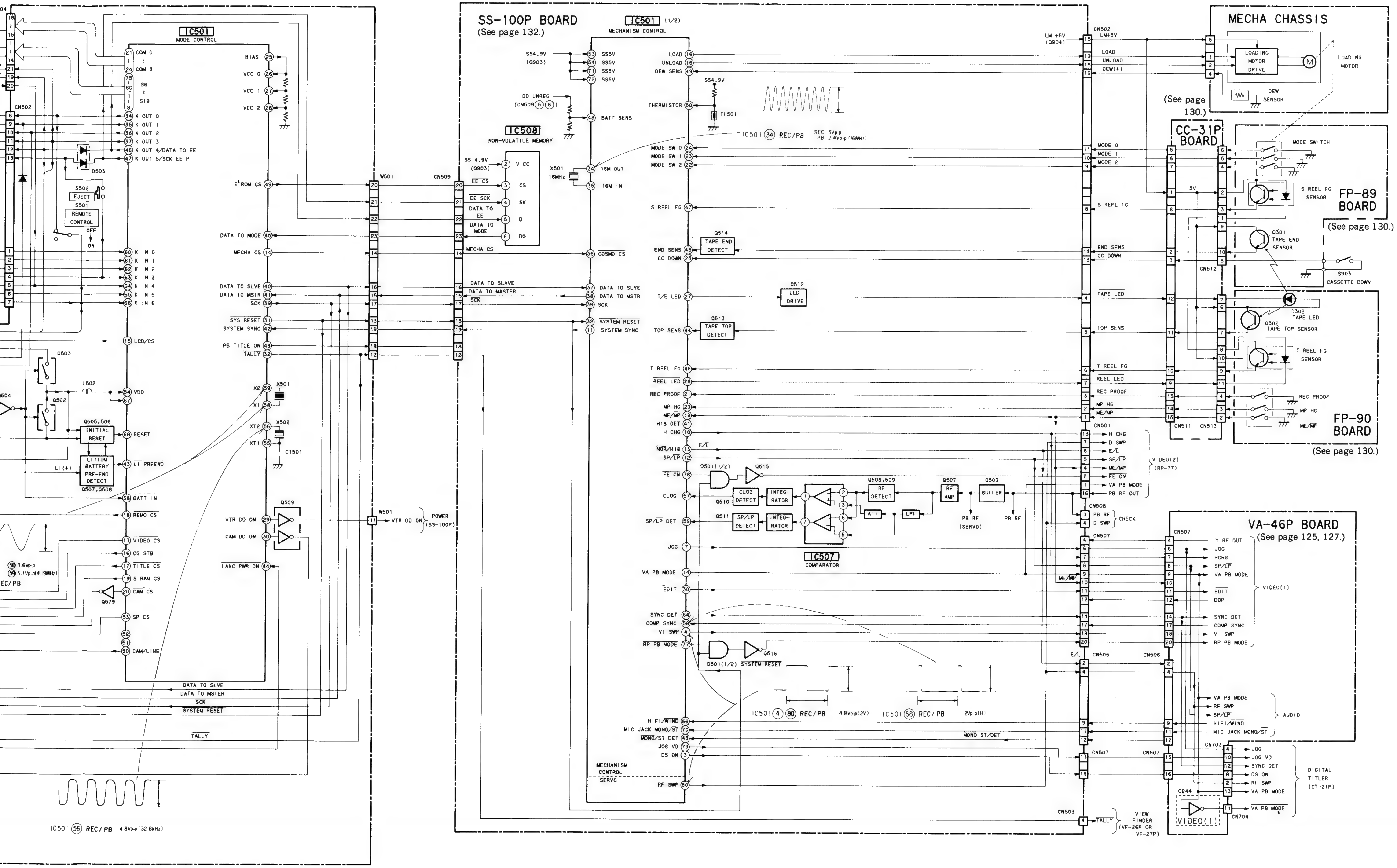




VIDEO(2)
(RP-77)
RF SWP
DIGITAL TITLER
(CT-21P)
AUDIO
(VA-46P)
SS4.9V
Q502 DRUM ACCEL
DRUM ERROR
I SENS
SS4.9V
0.16V
CAP ERROR
IC901 (1/2) DRUM/CAPSTAN PWM
DRUM/CAPSTAN PWM DRIVE
ERROR AMP
PWM COMP
SWITCHING DRIVE
SHORT CIRCUIT PROTECT
U.V. LO
TRIANGLE OSC
RV901
DD FO
MOTOR UNREG
(CN509 7 8)
Q901
D901, L903
SWITCHING
FLY WHEEL
DRUM VS
DRUM NFB
Q902
D901, L904
CAP VS
CAP FNB
DRUM VS
MOTOR UNREG
(CN509 7 8)
SS4.9V
(Q903)
IC503 (1/2)
DRUM MOTOR DRIVE
VCC2 VCC1
COM
VS
REF
OVER-HEAT PROTECT
ROTER POSITION DETECT
U IN
V IN
W IN
LPF
D506
DRM ON
CAP ON
STBY
START CONTROL
TIMING CONTROL
SOFT SWITING DRIVE
OUTPUT DRIVE BUFFER
OUTPUT DRIVE
DRM RVS
DRM BRK
DIR
BRAKE
I COM
R548-551
DRUM DRIVE CURRENT SENS
Q540
SILENCER
W510
DRM COM
DRM U
DRM V
DRM W
MECHA CHASSIS
DRUM MOTOR
IC504
CAPSTAN MOTOR DRIVE
VS
CAP FWD/RVS
FRC
CAP ON
STBY
POWER OFF
MOTOR UNREG
(CN509 7 8)
Vcc1
Vcc3
SS 4.9V
(Q903)
Vcc2
120° LOGIC
HE POWER
UHE (+)
VHE (+)
WHE (+)
VN-
VN+
W505
CAP U
CAP V
CAP W
HE Vcc
UHE(+),(-)
VHE(+),(-)
WHE(+),(-)
HE GND
CAPSTAN MOTOR
HALL DEVICE
IC506 ATF SERVO
3fH BPF
fH BPF
PEAK DET
SAMPLING HOLD
SCHMITT
AMP
V REF
ATF ERROR
CH1/CH2
TS B
TS A
RP PB MODE
SEL1
SEL2
OSC
X502
5.94755MHz
REC/PB 3Vp-p(5.94755MHz)

3-10. SYSTEM CONTROL BLOCK DIAGRAM





http://www.ManualsCenter.com

3-11. SERVO, SYSTEM CONTROL SYSTEM TERMINAL FUNCTION SS-100P BOARD IC501 (CXP-80116)

PIN No.	Signal Name	I/O	Function	Connection
1	SEL2	O	ATF REF PILOT signal frequency control ATF REF PILOT f_1 f_2 f_3 f_4 SEL 1 H L H L SEL 2 H H L L	ATF IC CXA1204Q
2	SEL1	O		
3	DS ON	O	Data Screen ON/OFF control. Data Screen ON and Data Screen key are selected with "H"	VIDEO block
4	VI SWP	O	RF SWP using for Vidoe system Normally, same as RF SWP. When using 'CH only "H" 3Head is used.	VIDEO block
5	DRM ACC	O	DRUM motor acceleration signal Acceleration is selected with "H"	To Drum motor driver CXA8006M
6	DRM BLK	O	DRUM motor brake signal Brake is selected with "H"	To Drum motor driver CXA8006M
7	JOG	O	Normal/JOG mode recognition signal JOG is selected with "H"	R/P Amp VIDEO block
8	FE RA	—	Not used	——
9	FE RS	—		
10	H CHG	O	2CH or 'CH select signal 'CH is selected with "H" Only 3Head is used	VIDEO system R/P Amp
11	SYSTEM SYNC	O	Internal bus communication synchronizing signal (V synchronization)	Mode controller
12	SP/$\overline{\text{LP}}$	O	SP/LP mode recognition signal SP mode is selected with "H"	R/P Amp VIDEO/AUDIO block
13	$\overline{\text{NOR}}$/Hi8	O	Not used. Normally, "L"	——
14	VA PB MODE	O	VIDEO/AUDIO system REC/PB mode select PB mode is selected with "H"	VIDEO/AUDIO block
15	UNLOAD	O	Loading motor control signal OFF LOADING UNLOADING BRAKE LOAD L H L H UNLOAD L L H H	To loading motor
16	LOAD	O		
17	CAP ON2	—	Not used	——
18	AF REC	—	Not used	——
19	ME/$\overline{\text{MP}}$	I	ME/MP tape recognition input ME tape is selected with "H"	To CC board
20	MP HG	I	MP HG tape recognition input MPHG is selected with "L"	To CC board
21	REC PROOF	I	REC PROOF recognition input REC PROOF is selected with "L"	To CC board
22	MODE SW2	I	Mechanical position input	To CC board
23	MODE SW1	I		
24	MODE SW0	I		
25	$\overline{\text{CC DOWN}}$	I	Cassette IN switch input Cassette IN is selected with "L"	To CC board
26	DRM ON	O	Drum motor drive control Motor Drive is selected with "H"	To Drum motor driver CXA8006M
27	T/E LED	O	LED for tape top end sensor drive control LED Flashing is selected with "H"	To CC board
28	$\overline{\text{REEL LED}}$	O	LED for reel sensor drive control LED Flashing is selected with "L"	To CC board

PIN No.	Signal Name	I/O	Function	Connection
29		—	Not used	——
30	EDIT	O	EDIT ON/OFF control EDIT is selected with "L"and interlocked with EDIT key.	To VIDEO block
31	SS GND	—	—	——
32	SYSTEM RESET	I	Control by mode controller with RESET terminal of this microcomputer RESET is selected "L"	Mode controller and others
33	SS GND	—	—	——
34	16M OUT	O	Crystal connecting terminal for system clock oscillation (16 MHz)	X'tal (X501)
35	16M IN	I		
36	COSMO CS	I	Select signal of this microcomputer from internal bus communication mode controller Selected with "L"	Mode controller
37	DATA TO SLVE	I	Serial data input terminal	Mode controller
38	DATA TO MSTR	O	Serial data output terminal	Mode controller
39	SCK	I	Serial clock input terminal	Mode controller
40	PCM ACT	—	Not used	——
41	Hi8 DET	—	Not used Normally, "L"	——
42	S IN	—	Not used Normally, "H"	——
43	MONO/ST DET	I	AFM monaural/stereo recognition input Stereo is selected "H" (Only stereo correspondence model)	To AUDIO block
44	TOP SENS	I	Tape top end sensor input TOP is selected with "H" END is selected with "H"	To CC board
45	END SENS	I		
46	T REEL FG	I	Reel sensor input Take up side	To CC board
47	S REEL FG	I	Reel sensor input Supply side	
48	BATT SENS	I	Battery input voltage sense	——
49	DEW SENS	I	DEW SENSOR input	DEW SENSOR
50	THERMISTOR	I	THERMISTOR input (This model : fixed value)	
51	ATF ERROR	I	ATF error (ATF LOCK error) input, A/D input terminal	IC506⑫
52	SS GND	—	—	——
53 54	SS 4.9V		Power source supply terminal	
55	DRM PG	I	DRUM PG input, FRC (high precision timer) capture input terminal	IC502 ⑨
56	HiFi/WIND	I	MIC HiFi/WIND input. HiFi is selected with "L", WIND is selected with "H"	To AUDIO block
57	CLOG	I	Clog detection signal input. CLOG is selected with "H"	Q510 ©
58	COMP SYNC	I	Composite SYNC (composite synchronizing signal) input. (built-in V SYNC separator)	To VIDEO block
59	SP/LP DET	I	SP/LP recognition signal input	Q511 ©

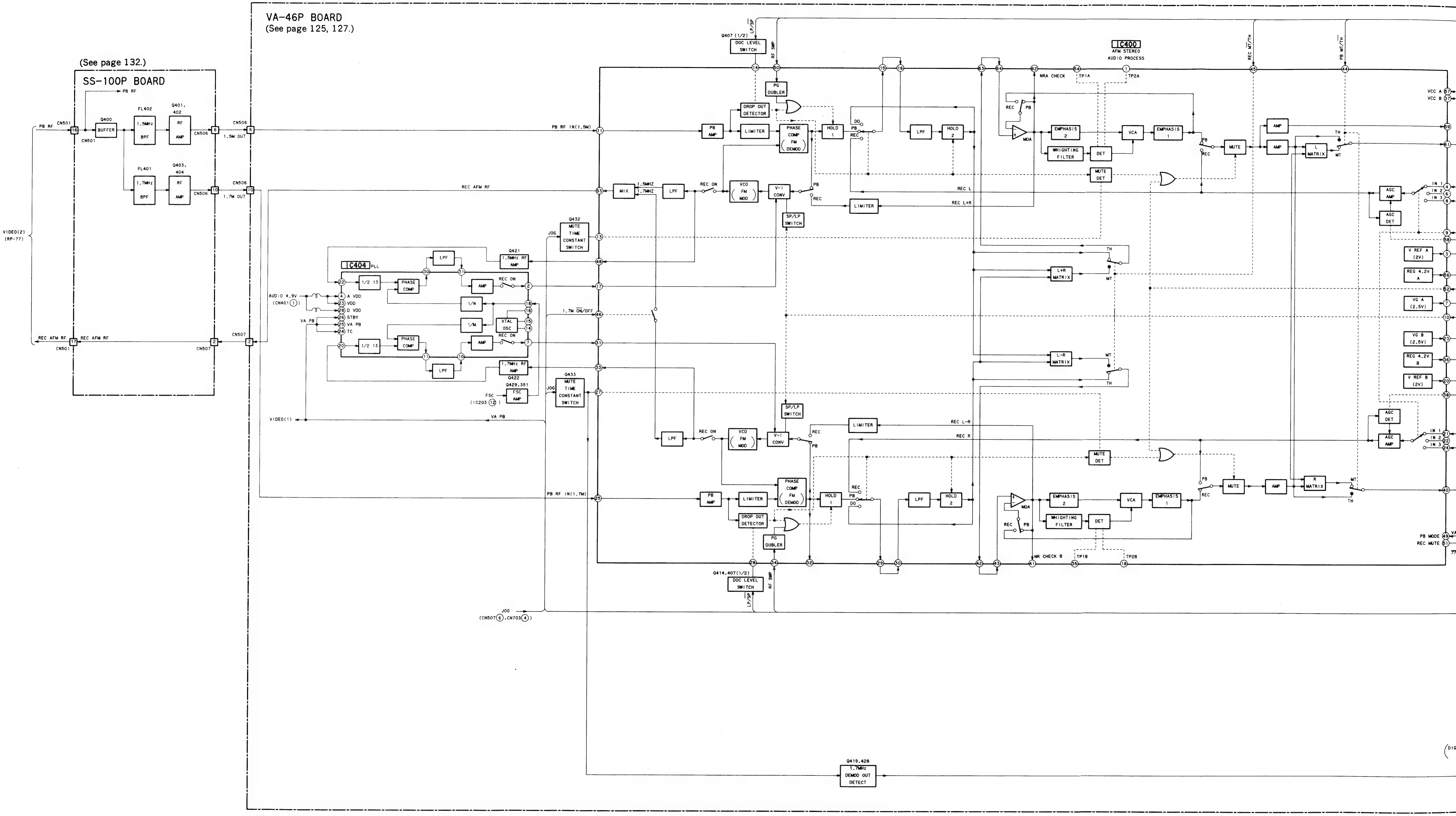
PIN No.	Signal Name	I/O	Function	Connection
60	DRM PG	—	—	——
61	DRM FG	I	DRUM FG input terminal, FRC capture input terminal	IC502 ⑩ Sense Amplifier
62	CAP FG	I	CAPSTAN FG input terminal, FRC capture input terminal	IC502⑫ Sense amplifier
63	MONO/$\overline{ST}$	—	Not used	——
64	SYNC DET	I	With/Without VIDEO signal recognition signal input	To VIDEO block
65	CAP D/A	O	DA gate pulse output terminal for CAP ERROR output, Servo exclusive output terminal (DA mode)	To capstan lowpass filter
66	DRM D/A	O	DA gate pulse output terminal for DRUM ERROR output, Servo exclusive output terminal (DA mode)	To drum lowpass filter
67	CAP PWM	O	PWM output terminal for CAP ERROR output, Servo excluseive output terminal (PWM mode)	Capstan driver IC503
68	DRM RVS	O	DRUM rotating direction control signal RVS is selected with "H" FWD is selected with "L"	IC503 ③
69	CAP FG	I	External event input terminal to CAP FG input terminal exclusive counter for TAPE COUNTER drive	IC502⑫ sense amplifier
70	MIC JACK MONO/$\overline{ST}$	I	External MIC Monaural/Stereo recognition signal. Monaural is selected with "H"	To AUDIO block
71 72	SS 4.9V			
73	SS GND	—	—	——
74	—	—	Not used	——
75	CAP ON	O	Capstan driver ON control signal	IC504⑬ Capstan driver
76	CAP FWD/$\overline{REV}$	O	Capstan rotaing direction control signal, FWD is selected with "H", RVS is selected with "L"	IC504⑳ Capstan driver
77	$\overline{RP\ PB\ MODE}$	O	REC/PB mode select signal of RP amplifier and ATF IC	Q516 Ⓑ
78	FE ON	O	Flying erase oscillation ON/OFF signal. Oscillation is selected with "H"	To RP AMP.
79	JOG VD	O	Artificial VD output terminal input to VIDEO signal in varying speed playback	To VIDEO block
80	RF SWP	O	RF SWP output temrinal	RP block VIDEO/AUDIO block

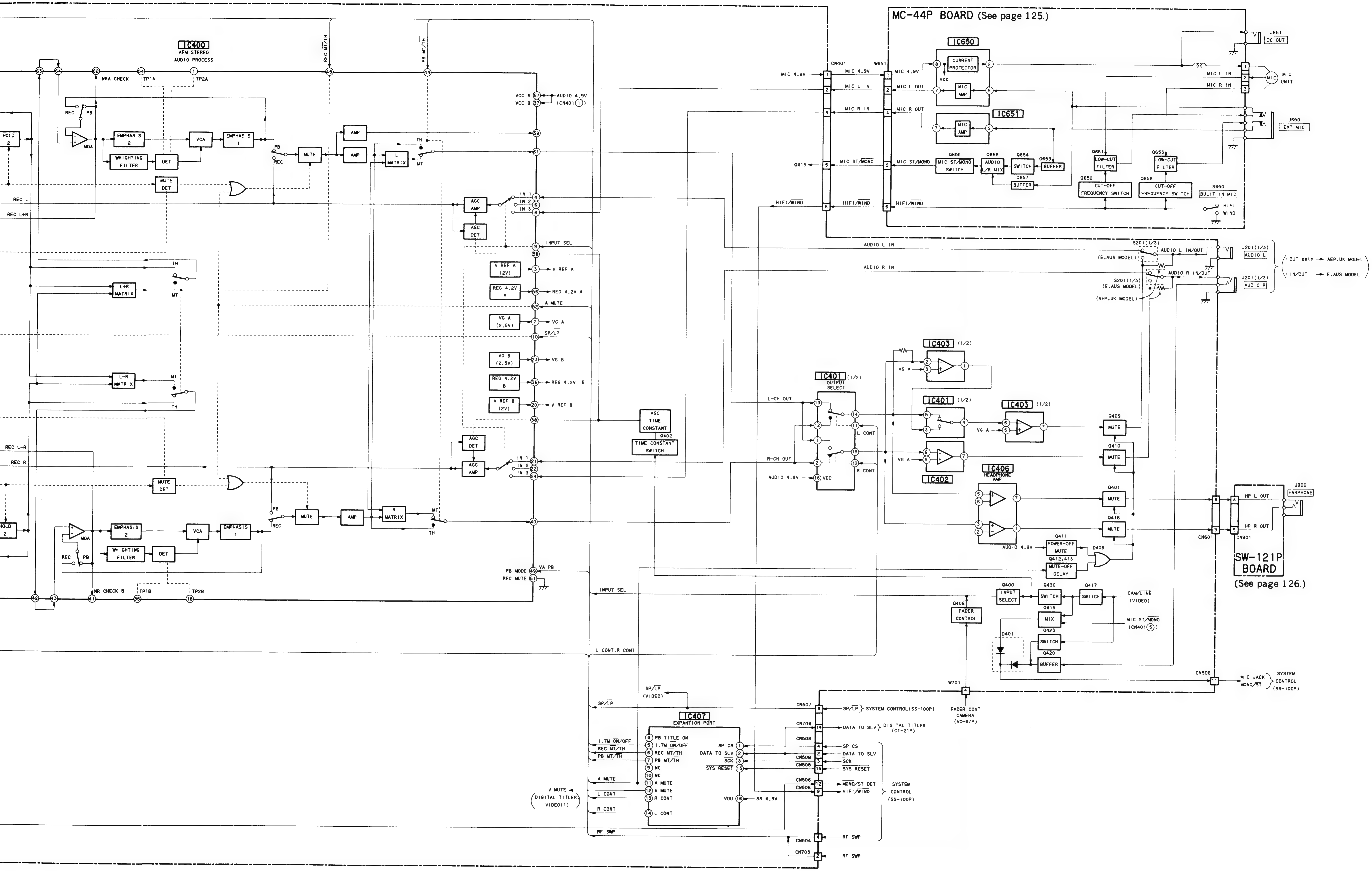
3-12. MODE CONTROL SYSTEM IC TERMINAL FUNCTION DESCRIPTION FU-72P BOARD IC501 (μPD75312)

PIN No.	Port Name	Function	I/O	Connection	Signal Name
1	S12	Segment signal output	O	LCD	S12
2	S13	LCD segment terminal drive	O	LCD	S13
3	S14	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S14
4	S15	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S15
5	S16	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S16
6	S17	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S17
7	S18	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S18
8	S19	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S19
9	S20	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S20
10	S21	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S21
11	S22	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S22
12	S23	Output (Four value output of 0, 1.7, 3.3, 5V)	O	LCD	S23
13	S24/BP0	Chip select signal to video IC (CXA1207) 1V period "L" pulse	O	VA	$\overline{\text{VIDEO CS}}$
14	S25/BP1	Chip select signal to SS-100 BOARD IC501 (CXP80116) 1V period "L" pulse	O	SS IC501	$\overline{\text{MECHA CS}}$
15	S26/BP2	Timing pulse of power source ON/OFF to photosensor 1V period "H" pulse	O	CK-20P,Q672	LED CONT
16	S27/BP3	Strobe signal for character generator (μPD6451) 1V "H" pulse train.	O	VA	CG STB
17	S28/BP4	Chip select to titler (CF79028) 1V "L" pulse	O		$\overline{\text{TITEL CS}}$
18	S29/BP5	Chip select to sercs remote control (μPD7564) 1V "L" pulse	O	DK-5P	$\overline{\text{REMO CS}}$ REMOTE CONTROL
19	S30/BP6	Chip select to S RAM. "H" when using title, Normally, "L"	O		S RAM CS
20	S31/BP7	Chip select to camera μCON 1V period "H" pulse	O	CAMERA	CAM CS
21	COM0	LCD to common signal output Common terminal drive output	O	LCD	COM0
22	COM1		O	LCD	COM1
23	COM2		O	LCD	COM2
24	COM3		O	LCD	COM3
25	BIAS	Output terminal for outside dividing resistance cut, Power input	O	LCD	BIAS
26	VLC0	Power source for LCD drive, 3V in backup: Power source 0 input terminal	I	FU	VLC0
27	VLC1	Power source 1 input terminal	I	FU	VLC1
28	VLC2	Power source 2 input terminal	I	FU	VLC2
29	P40	SS 5V,VTR 5V power source detection, "H" when VTR power source is turned ON.	O	VA	VTR DD ON
30	P41	CAM 5V power source detection	O	CAMERA	$\overline{\text{CAM DD ON}}$
31	P42	Output port to reset each IC when power is turned on.	O	all	$\overline{\text{SYS RESET}}$
32	P43	External tally and internal tally drive port	O	VA and DK	$\overline{\text{TALLY}}$
33	V_{ss}	GND			V_{ss}
34	P50	L active KEY matrix output port	O	all	K OUT0
35	P51		O	all	K OUT1
36	P52		O	all	K OUT2
37	P53		O	all	K OUT3
38	P00/INT4	Clock select to 32K with "L" and to 4.19M with "H" when Battery is turned on, "L" is select.	I	FU	$\overline{\text{BATT IN}}$

PIN No.	Port Name	Function	I/O	Connection	Signal name
39	P01/$\overline{\text{SCK}}$	Serial clock input-output terminal, Serial clock (2μS) communication	O	all	$\overline{\text{SCK}}$
40	P02/SO/SB0	Serial clock input-output terminal, Serial clock (2μS) communication	O	all	DATA TO SLV
41	P03/SI/SB1	Serial bus input-output terminal, Serial clock (2μS) communication	I	all	DATA TO MASTR
42	P10/INT0	(Edge detection vector interruption), System synchronization input port from CXD80116	I	SS IC501	SYSTEM SYNC
43	P11/INT1	(Edge detection vector interruption), Lithium PRE END is selected with "L"	I	FU	$\overline{\text{LI PRE END}}$
44	P12/INT2	STABY release input, Release wiht "L" , STA	I	VA	$\overline{\text{LINCS PWR ON}}$
45	P13/TIO	EE PROM serial communication data input, EE PROM communiaction KEY matrix OUT is combined.	I	SS IC508	DATA TO MODE
46	P20/PT00	EE PROM serial communication date output, EE PROM communication KEY matrix OUT is combined.	O	SS IC508	KOUT4/DATA TO EE
47	P21	EE PROM serial communication clock output key matrix output, EE PROM communication KEY matrix OUT is combined.	O	SS VK IC508	KOUT5/SCK EE
48	P22/PCL	Not used	O		PB TITLE ON
49	P23/BUZ	Chip select to EEP ROM	O	SS IC508	$\overline{\text{EE PROM CS}}$
50	P30/LCDCL	CAMERA/LINE select output, Camera mode is selected wiht "H", VTR is selected with "L"	O	VA	CAM/$\overline{\text{LINE}}$
51	P31/SYNC	Video mute output	O	VA	V MUTE
52	P32	Audio mute output	O	VA	A MUTE
53	P33	Chip select to serial/parallel IC	O	VA	SP CS
54	V_{DD}	V_E 3V/5V power source terminal		FU	V_{DD}
55	XT1	Sub system clock 32K oscillation terminal	I	FU	XT1
56	XT2			FU	XT2
57	NC			—	NC
58	X1	Main system clock 4.19M oscillation terminal	I	FU	X1
59	X2		I	FU	X2
60	P60/KK0	KEY matrix input terminal 18msec period normally "H" Input-Output is possible by bit. Pull-up from software is possible by 4-bit.	I	all	K IN 0
61	P61/KR1		I	all	K IN 1
62	P62/KR2		I	all	K IN 2
63	P63/KR3		I	all	K IN 3
64	P70/KR4	KEY matrix input terminal. 18msec period normally "H" 4-bit input-Output port. Pull-up from software is possible by 4-bit.	I	all	K IN 4
65	P71/KR5		I	all	K IN 5
66	P72/KR6		I	all	K IN 6
67	P73/KR7		I	all	K IN 7
68	$\overline{\text{RESET}}$	System reset input, Reset input terminal of microcomputer	I		$\overline{\text{RESET}}$
69	S0	LCD segment signal output terminal.	O	LCD	S0
70	S1		O	LCD	S1
71	S2		O	LCD	S2
72	S3		O	LCD	S3
73	S4		O	LCD	S4
74	S5		O	LCD	S5
75	S6		O	LCD	S6
76	S7		O	LCD	S7
77	S8		O	LCD	S8
78	S9		O	LCD	S9
79	S10		O	LCD	S10
80	S11		O	LCD	S11

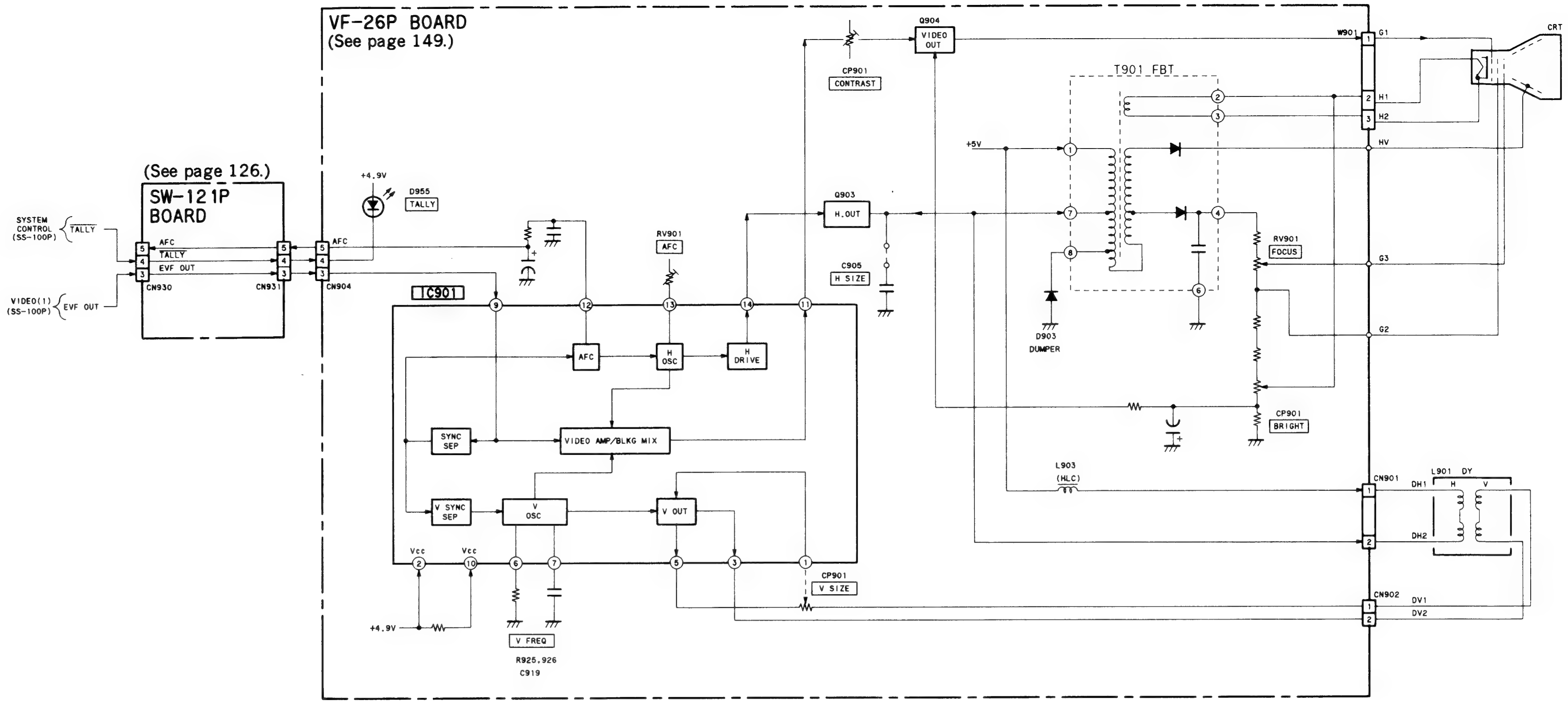
3-13. AUDIO BLOCK DIAGRAM

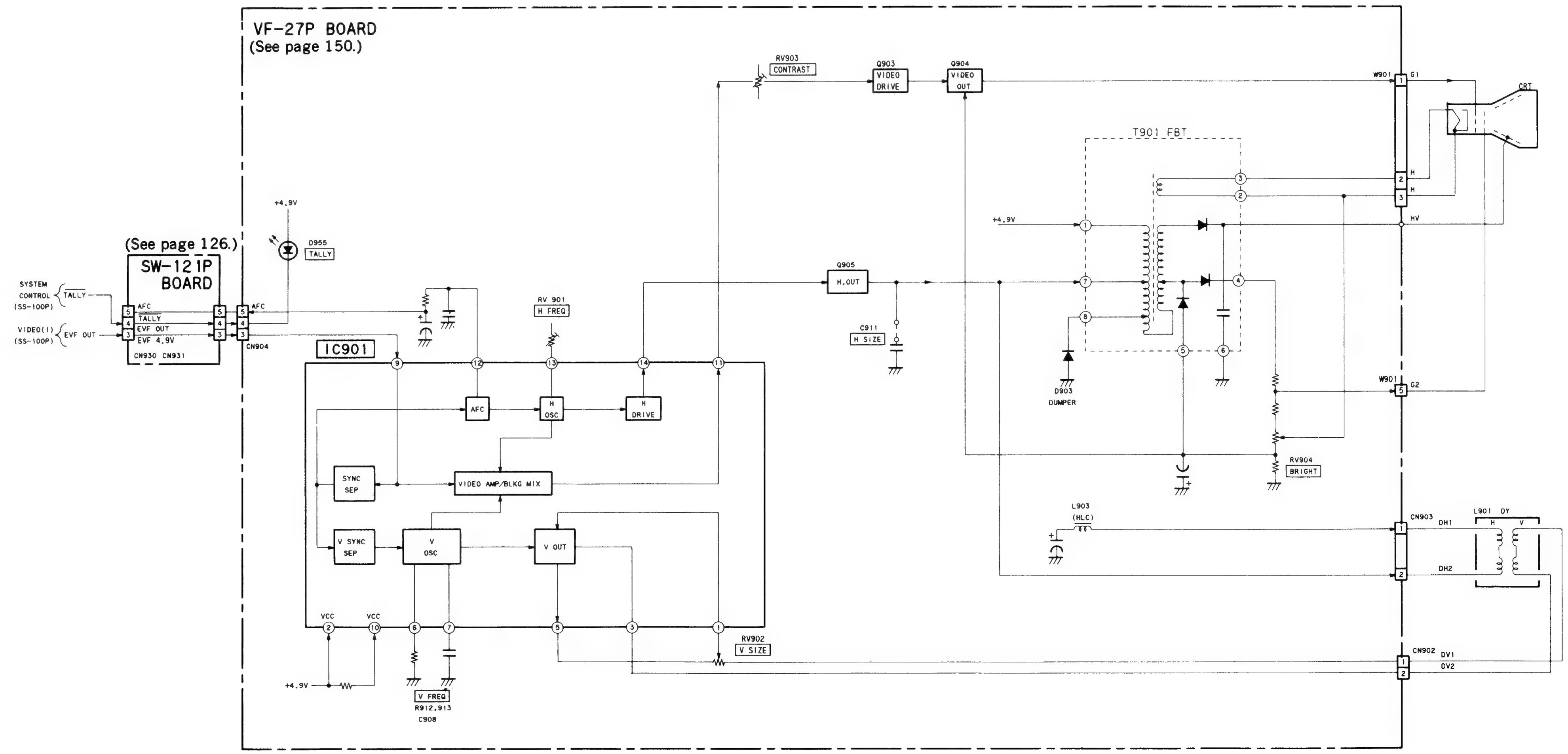




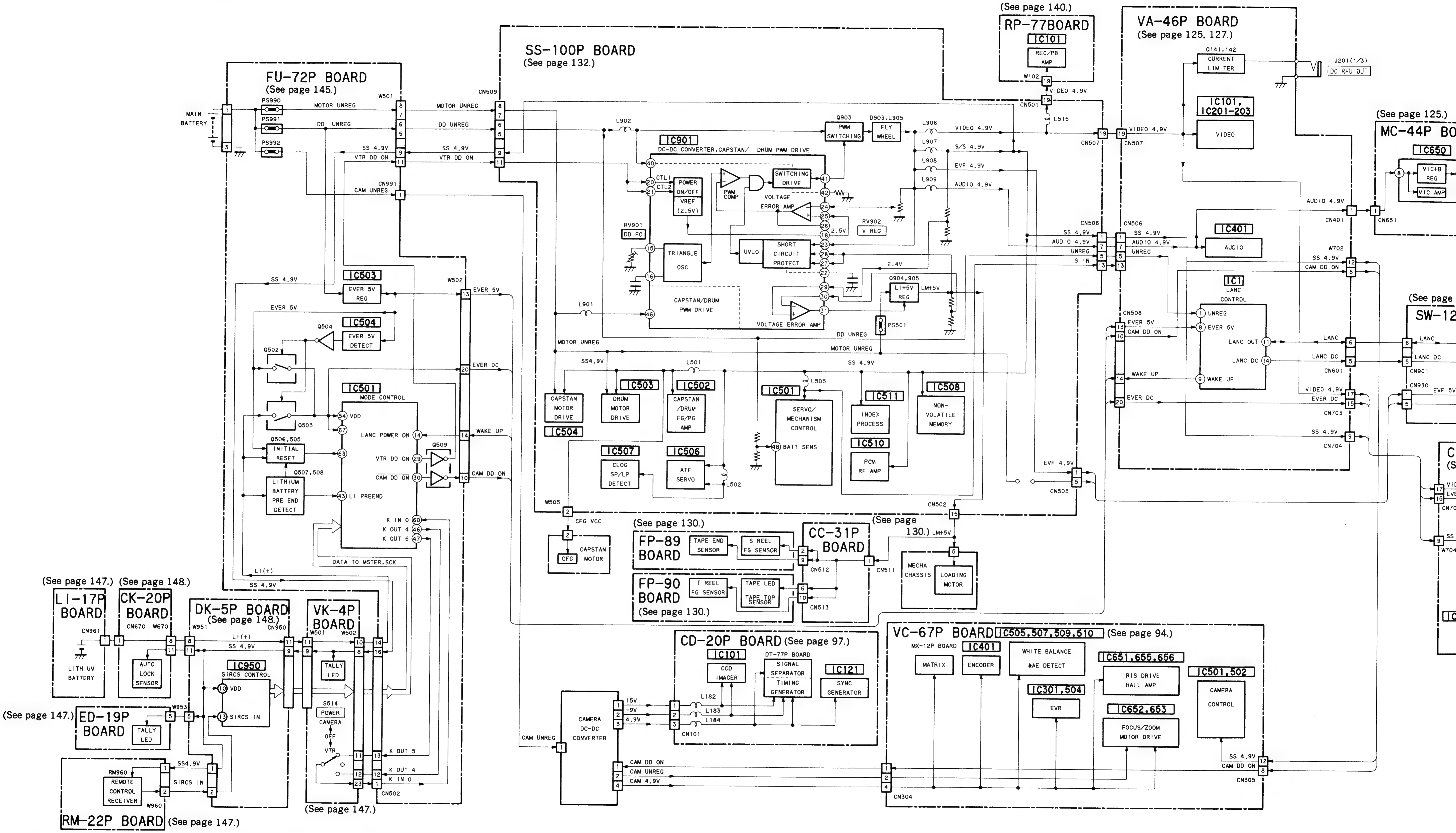
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3-14. VIEWFINDER BLOCK DIAGRAM

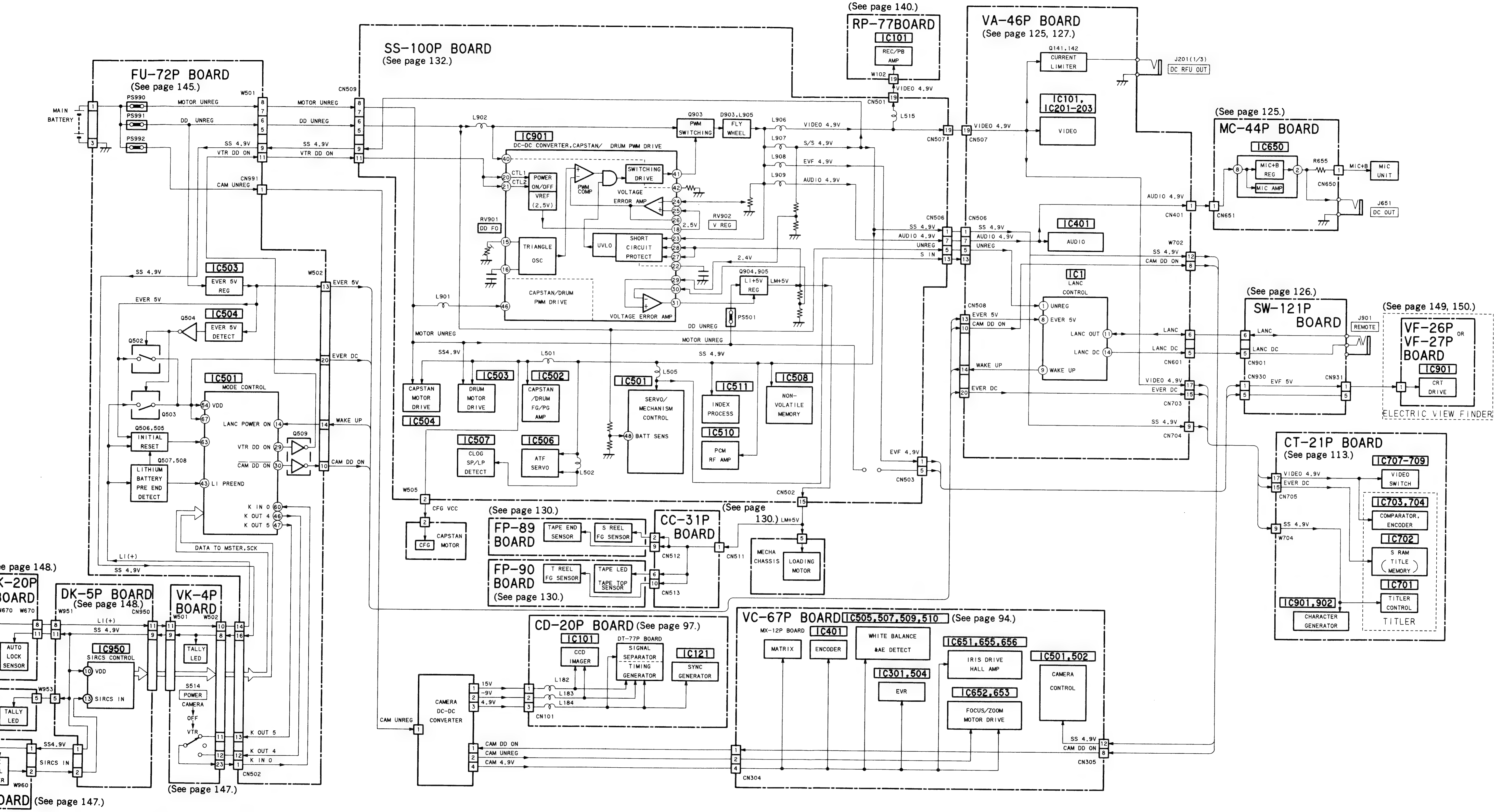




3-15. POWER BLOCK DIAGRAM



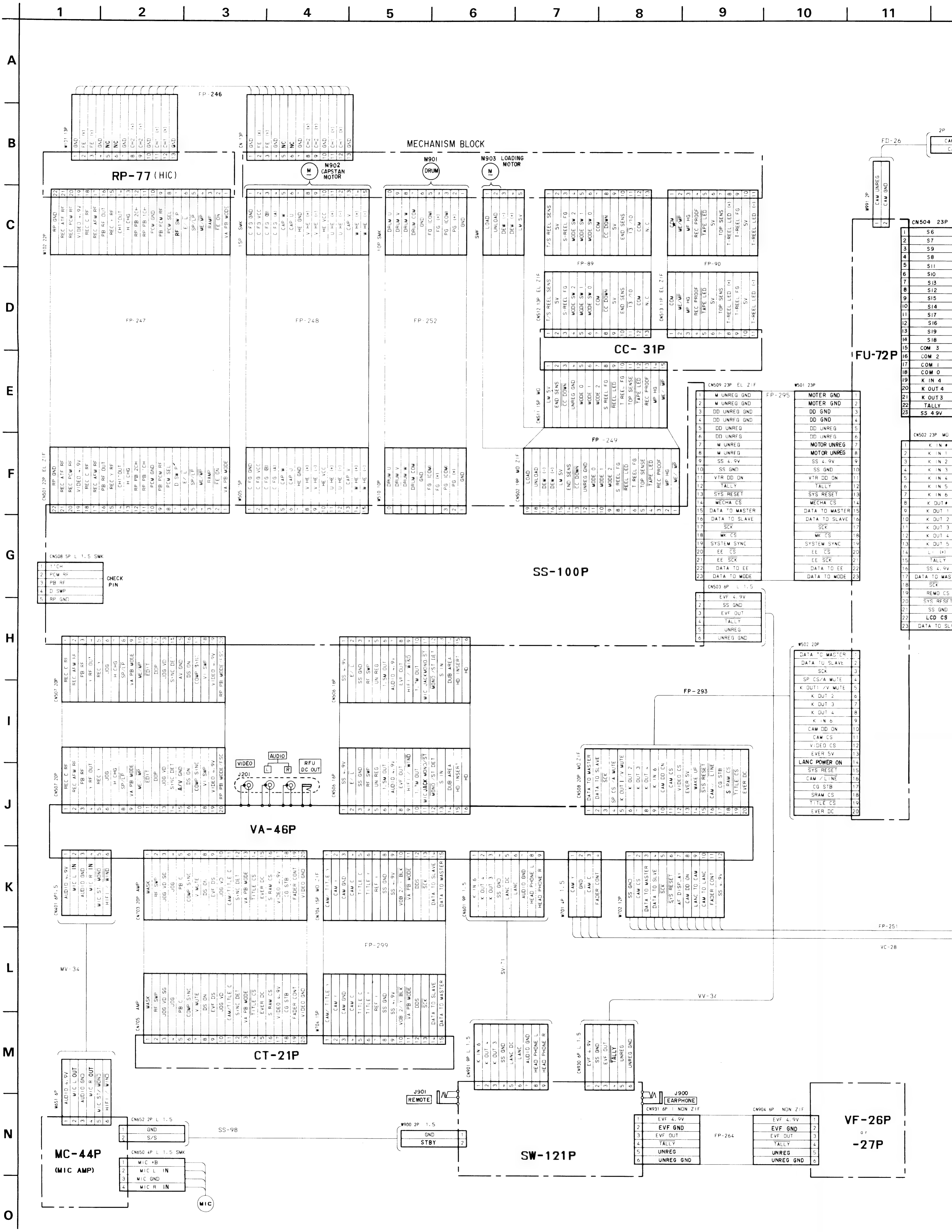
LOCK DIAGRAM

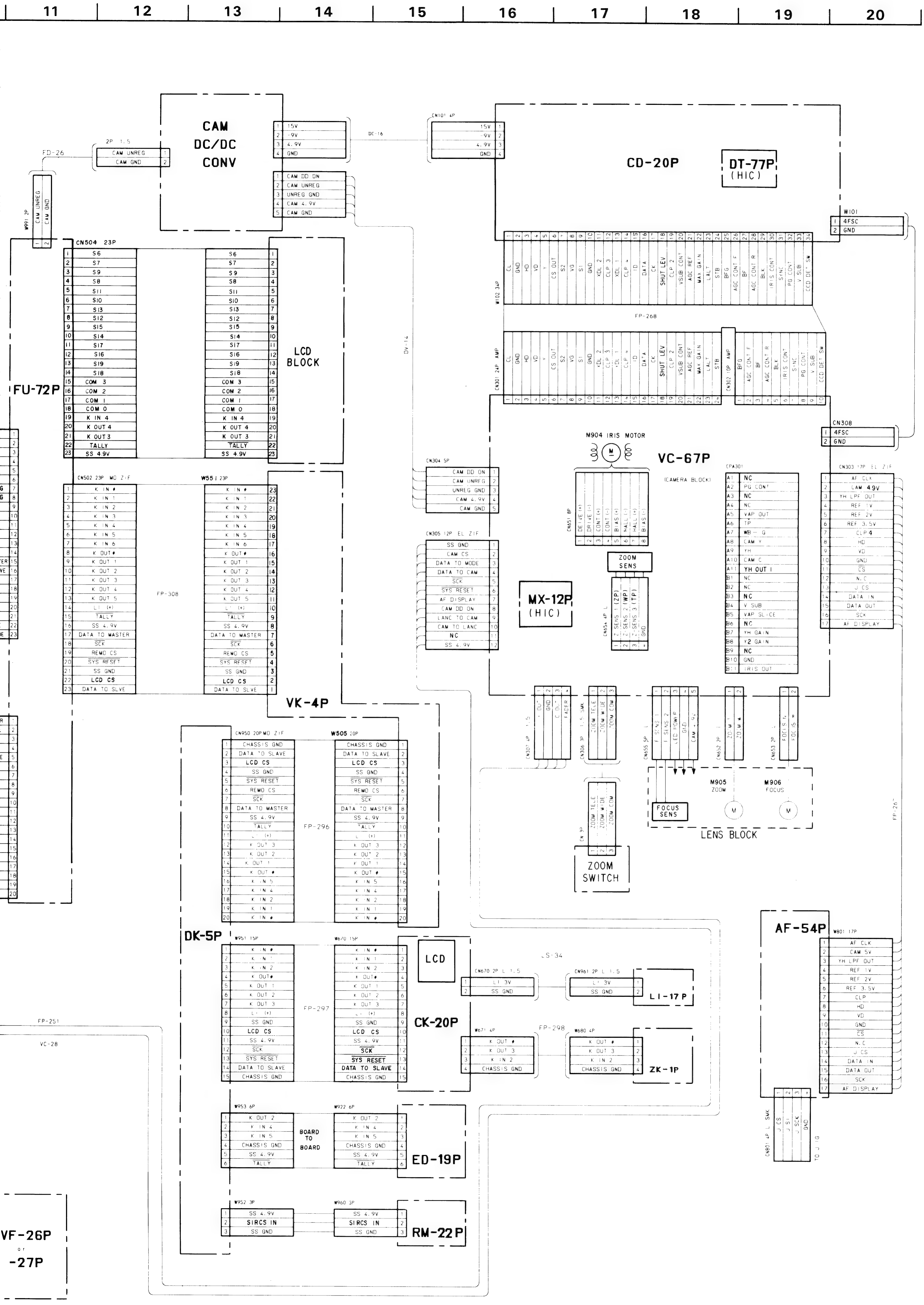


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SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM





4-2. PRINTED WIRIN

THIS NOTE IS C
AND SCHEMATIC
(In addition to thi

- **For printed wiring bo**
- ● : Through hole.
- : Pattern from t
- : Pattern of the
- Circled numbers ref

- **For schematic diagra**
- Caution when replac
  New parts must be a
  Be careful not to
  because it is damage
- All resistors are in c
  kΩ: 1000Ω, MΩ: 10
- All capacitors are in
  50V or less are not
  tantalums.
- All variable and adj
  unless otherwise note
- : nonflammabl
- : fusible resisto
- : panel designa
- △ : internal comp
- : adjustment fo
- : B + Line*
- Circled numbers refe
- : IN/OUT direc

Note: The componen
line with mark
Replace only w

When indicating par
ence number, plea
the board name.

* Indicated by the co

[SEMICONDUCTOR L

In this service manual
semiconductors (IC, transi
shown below. This enable
easily when servicing.

-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For printed wiring boards.**
- ● : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.*
- Circled numbers refer to waveforms.

- **For schematic diagram.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W or 1/16W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.*
- : B + Line*
- Circled numbers refer to waveforms.*
- : IN/OUT direction of B (+, −) line.*

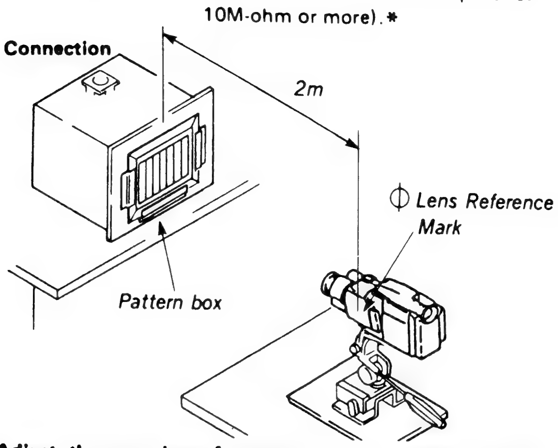
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

* Indicated by the color red.

- **For voltage and waveforms. (CAM REC mode)**
- Voltage and waveform measuring conditions:*
  (1) Sample object: Pattern box color bars.*
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).*

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

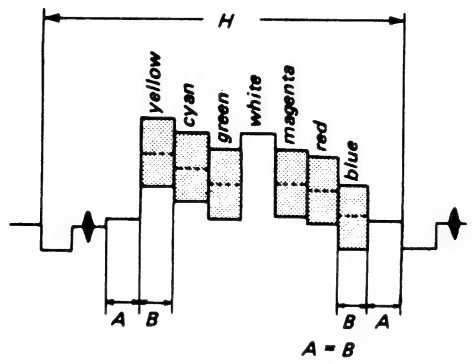


Fig. a Video output waveform.

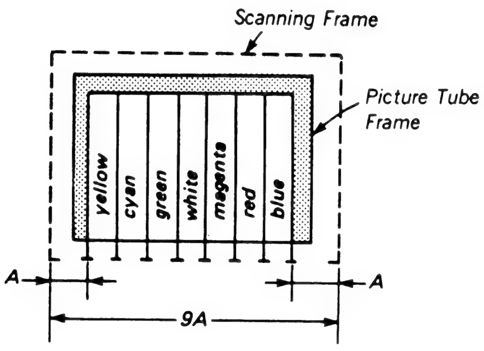


Fig. b Picture of TV monitor screen

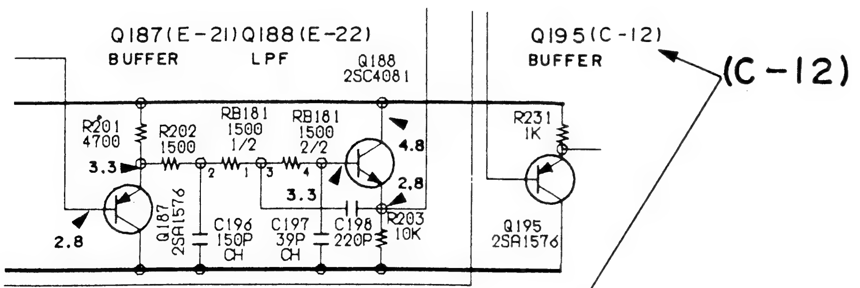
- **For voltage and waveforms. (REC/PB mode)**
- Voltages are dc between ground and measurement points.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

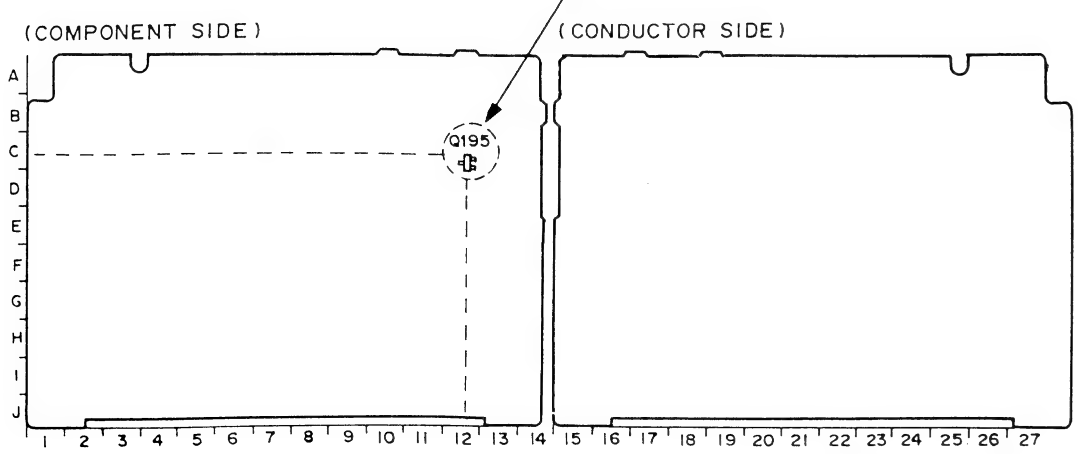
Precautions for replacement of CCD imager block.

- With a pair of IC101 (CCD imager) on the CD-20P complete board and IC001 (corrector ROM) on the DT-77P complete board, it is used a repair part of the CCD imager block.
  Since corrector ROM IC is manufactured to match the CCD imager, replacement of a single unit of the CCD imager corrector ROM can-not be allowed.
- When both a CCD imager and the corrector ROM, replace both the CCD imager and the corrector ROM, when a corrector ROM is not mounted on the service set, install a corrector ROM which is supplied anew.
- IC101 (CCD imager) is not mounted on the CD-20P complete board to be supplied as a repair part, and IC001 (corrector ROM) is not mounted on the DT-77P complete board to be supplied as a repair part. When the respective boards are replaced, remove the respective ICs from the old boards and install them to the new once respectively.
- After the CCD imager block has been replaced, perform the entire adjustments of the camera section.
- CCD imager is structurally in case of being broken down by static electricity.
  For this reason, take care to handle it as well as MOS IC. Moreover, care should be taken for dust not to be stuck on the light reseiving section and for strong light not to get into there.

EMICONDUCTOR LOCATION]

this service manual, the mounted locations of the miconductors (IC, transistor, diodes) are indicated in red sa own below. This enables to find the location on the board sily when servicing.

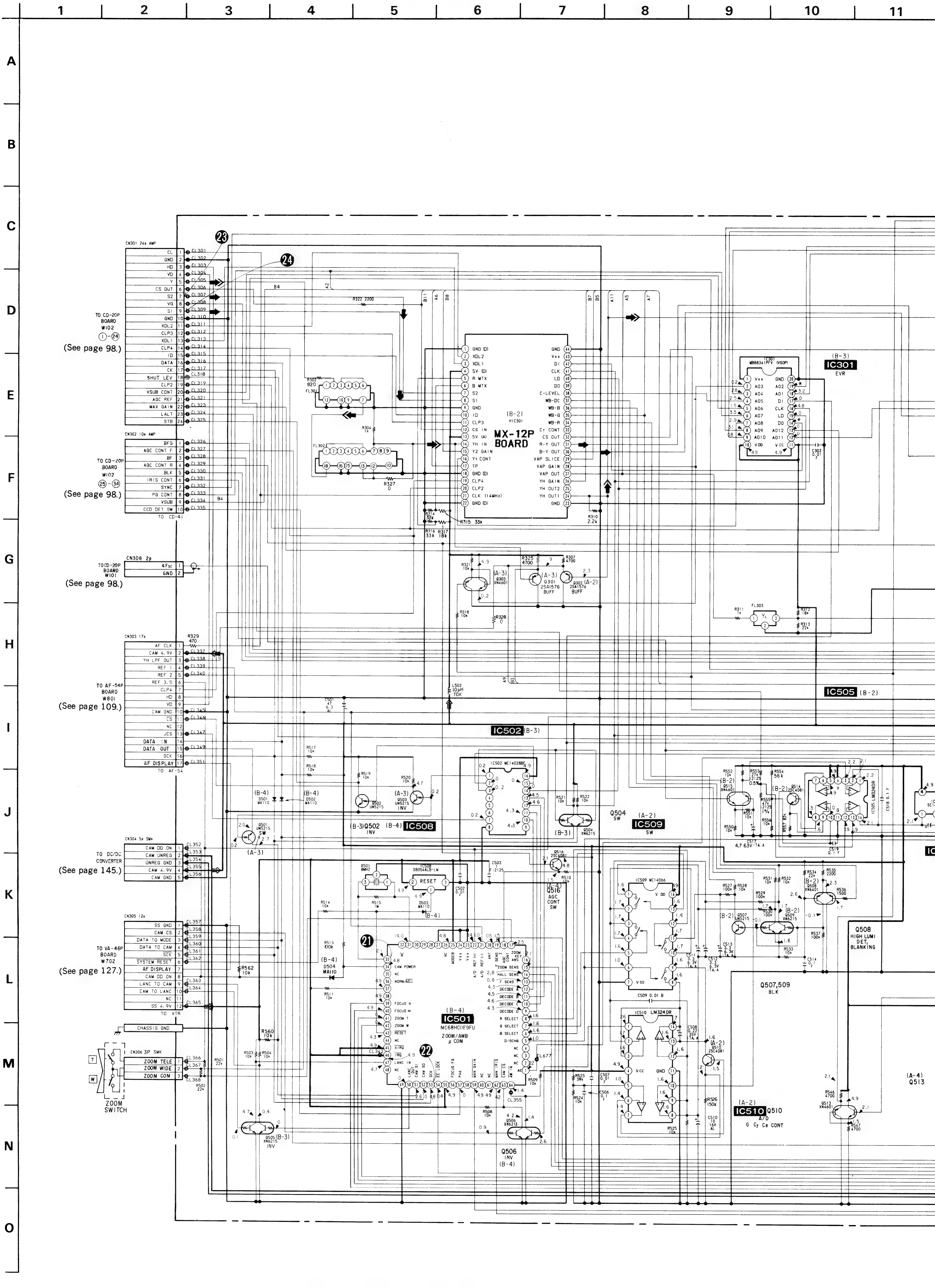


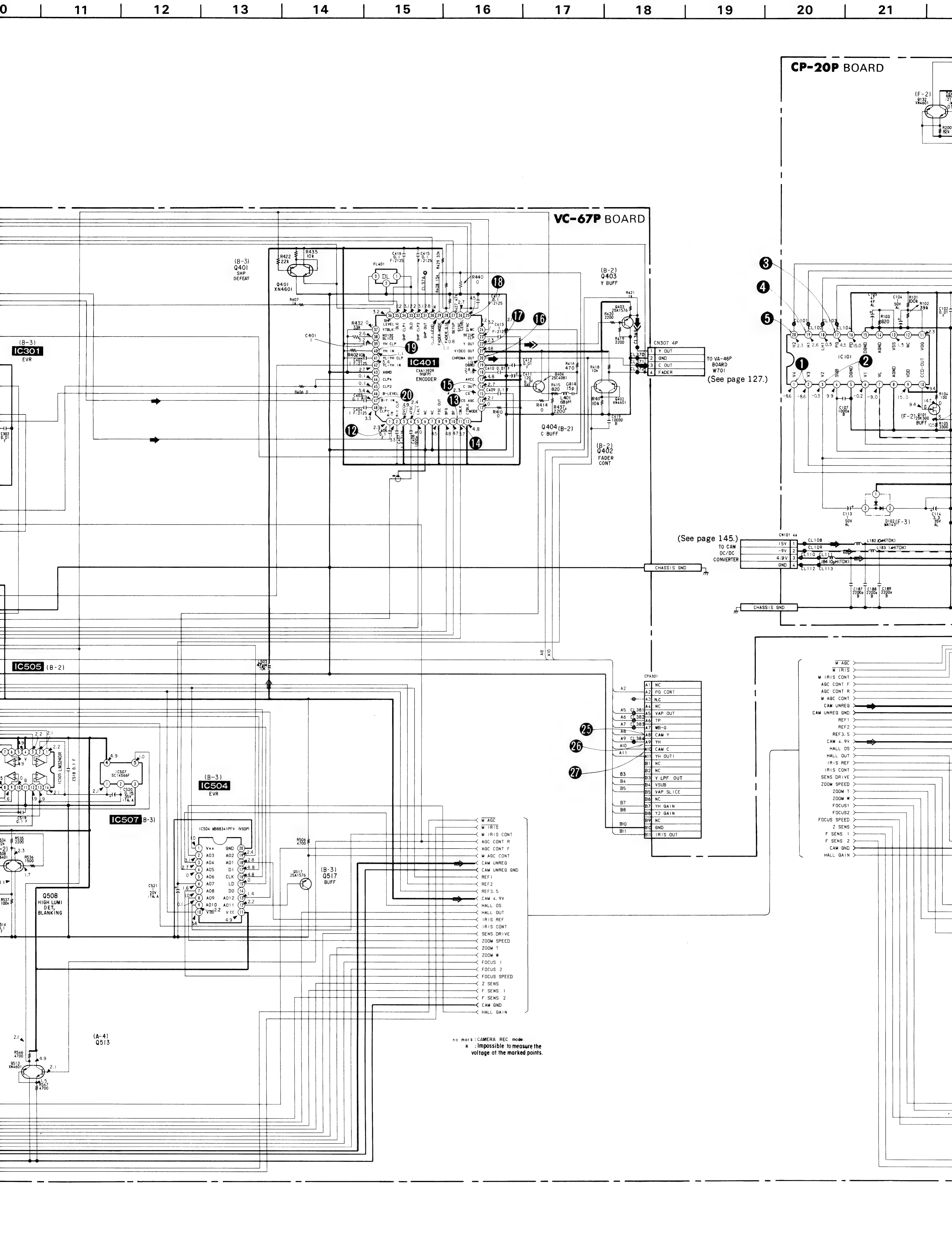


[Semiconductor for Correction List Display]
Part code and part name of the semiconductor for correction of the print board is described in the space of each print figure. Use this list when ordering parts.

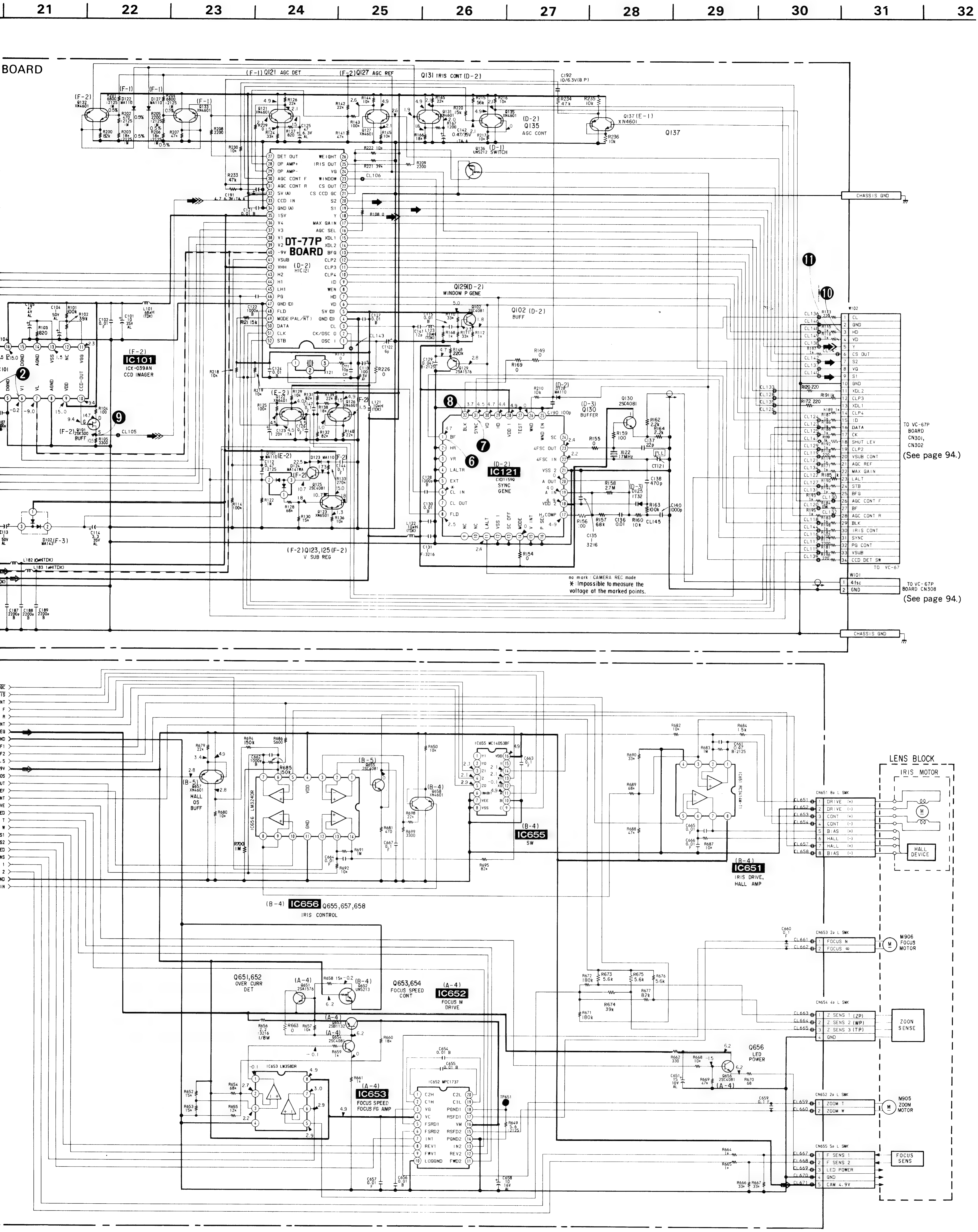
CD-20P (CCD IMAGER), VC-67P (CAMERA PROCESS, ZOOM/FOCUS) SCHEMATIC DIAGRAM

—Ref. No. CD-20P, VC-67P BOARDS : 1000 series—





10
11
12
13
14
15
16
17
18
19
20
21
CP-20P BOARD
VC-67P BOARD
IC301
EVR
IC401
CXA1392R
ENCODER
IC505
IC504
EVR
IC507
(B-3) Q401 SHP DEFEAT
(B-2) Q403 Y BUFF
Q404 (B-2) C BUFF
(B-2) Q402 FADER CONT
(B-3) Q517 BUFF
Q508 HIGH LUMI DET, BLANKING
(A-4) Q513
IC101
CN307 4P
Y OUT
GND
C OUT
FADER
TO VA-46P BOARD W701
(See page 127.)
(See page 145.)
TO CAM DC/DC CONVERTER
CHASSIS GND
CPA301
M AGC
M IRIS
M IRIS CONT
AGC CONT R
AGC CONT F
M AGC CONT
CAM UNREG
CAM UNREG GND
REF1
REF2
REF3.5
CAM 4.9V
HALL OS
HALL OUT
IRIS REF
IRIS CONT
SENS DRIVE
ZOOM SPEED
ZOOM T
ZOOM W
FOCUS 1
FOCUS 2
FOCUS SPEED
Z SENS
F SENS 1
F SENS 2
CAM GND
HALL GAIN
no mark: CAMERA REC mode
*: Impossible to measure the voltage at the marked points.

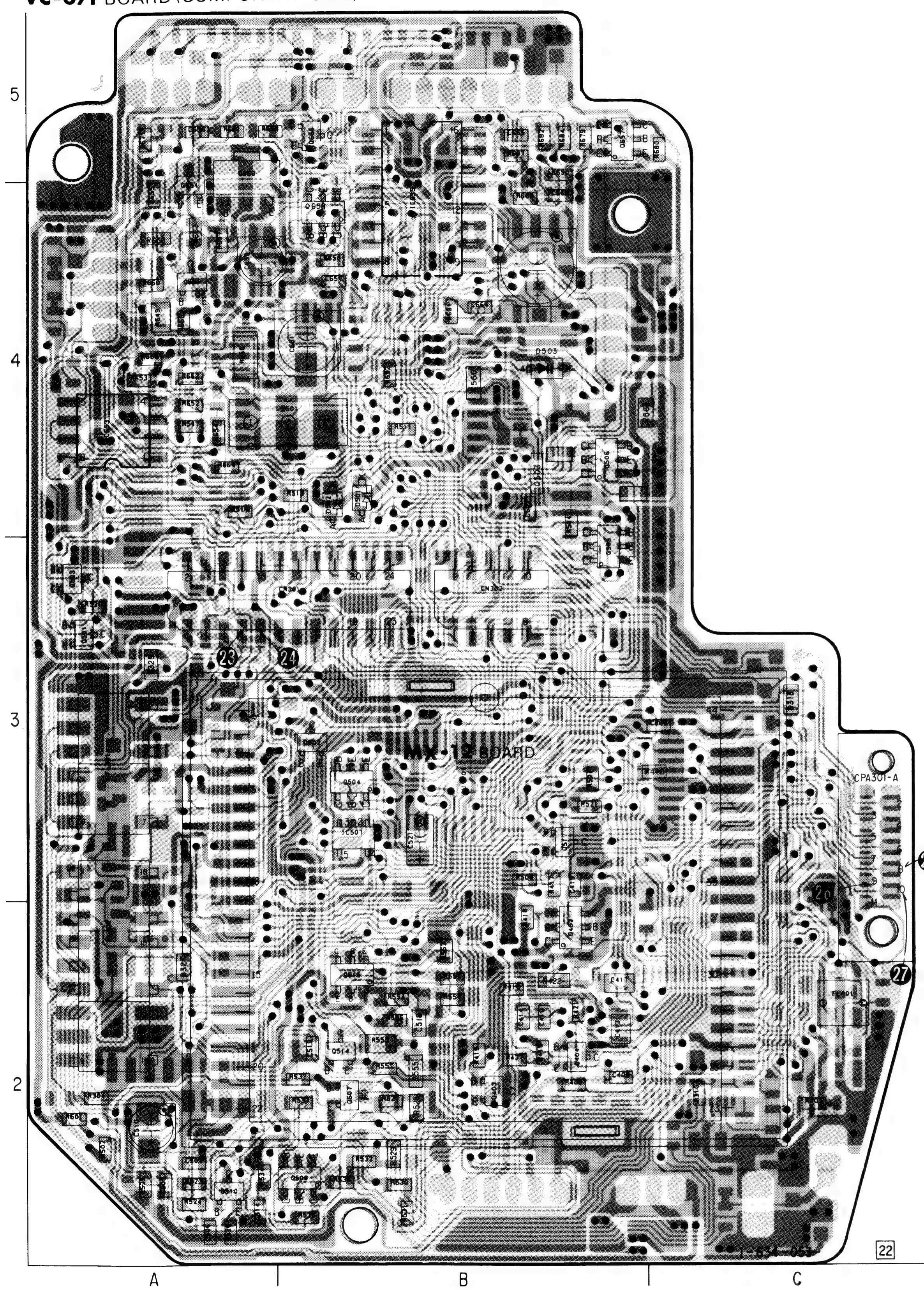


Be sure to alway
block" in page93
board, complete a
and IC001 on th

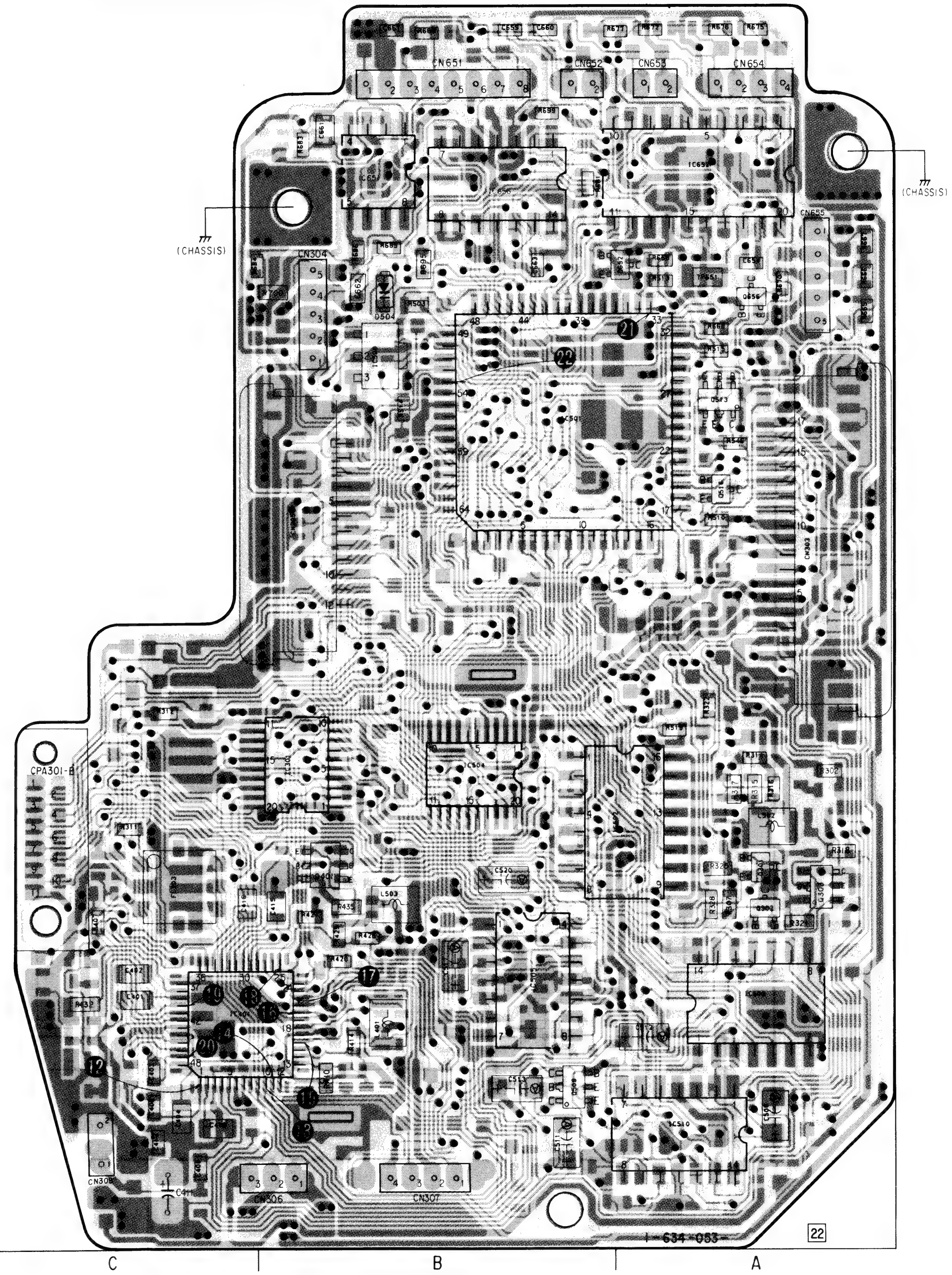
CD-20P (CCD IMAGER), VC-67P (CAMERA PROCESS, ZOOM/FOCUS) PRINTED WIRING BOARDS

—Ref. No. CD-20P, VC-67P BOARDS : 1000 series—

VC-67P BOARD (COMPONENT SIDE)



VC-67P BOARD (CONDUCTOR SIDE)



DIODE

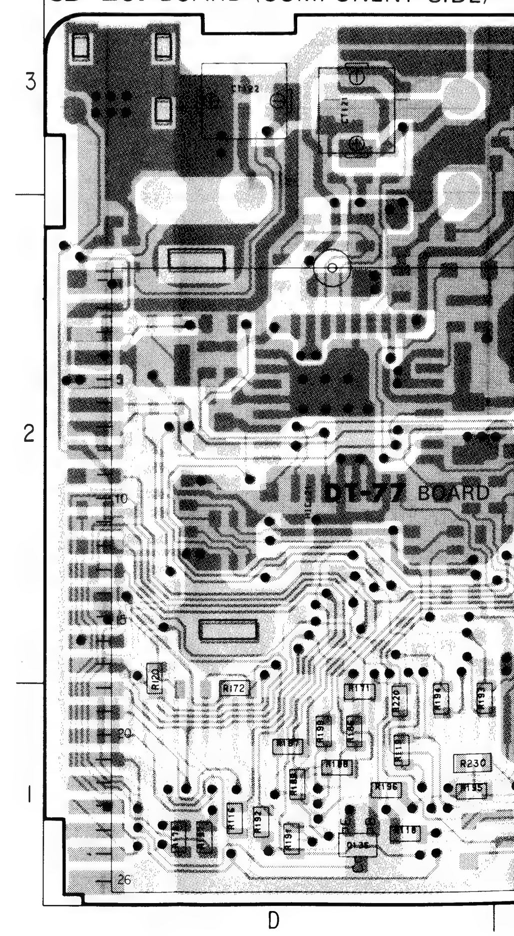
D501	8-719-404-46	DIODE MA110
D502	8-719-404-46	DIODE MA110
D503	8-719-404-46	DIODE MA110
D504	8-719-404-46	DIODE MA110

IC

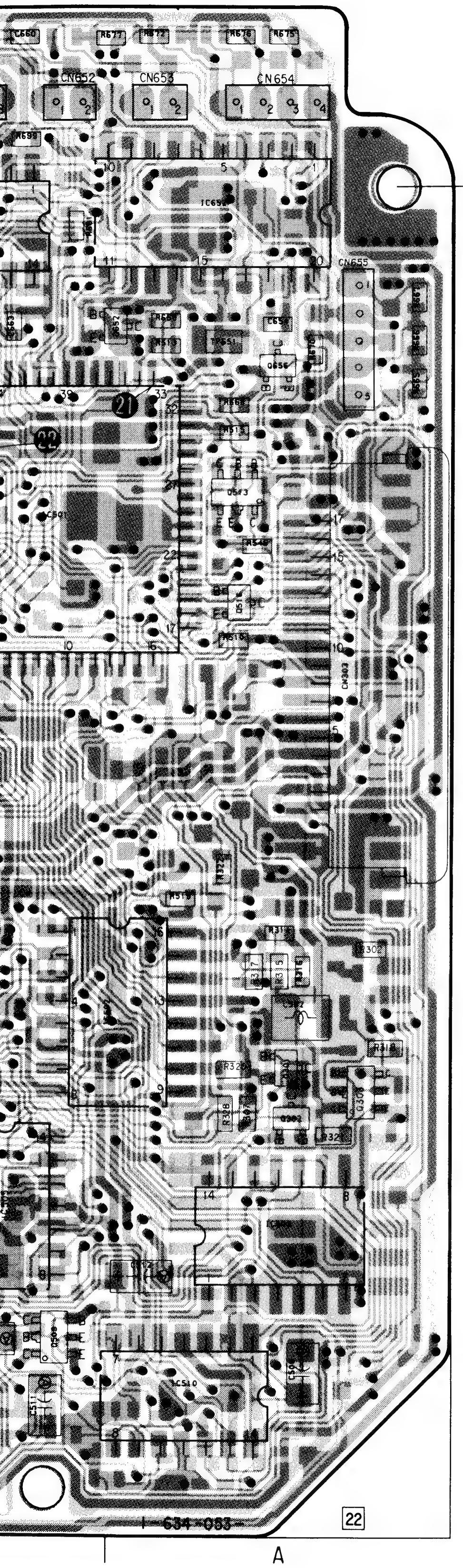
IC301	8-759-946-00	IC MB88341PFV
IC401	8-752-038-XX	IC CXA1392R
IC501	8-759-037-58	IC MC68HC11E9FUSC400217
IC502	8-759-008-95	IC MC14028BF
IC504	8-759-946-00	IC MB88341PFV
IC505	8-759-998-96	IC LM324DR
IC507	8-759-030-74	IC SC14S66F
IC508	8-759-937-56	IC S-8054ALB-LM-S
IC509	8-759-932-54	IC MC14066BF
IC510	8-759-998-96	IC LM324DR
IC651	8-759-981-82	IC RC3414M
IC652	8-759-037-20	IC MPC1737M
IC653	8-759-998-98	IC LM358DR
IC655	8-759-009-07	IC MC14053BF
IC656	8-759-998-96	IC LM324DR

Q301
Q302
Q303
Q401
Q402
Q403
Q404
Q501
Q502
Q503
Q504
Q505
Q506
Q507
Q508
Q509
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Q513
Q514
Q515
Q516
Q517
Q651
Q652
Q653

CD-20P BOARD (COMPONENT SIDE)



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DIODE

D501	8-719-404-46	DIODE MA110
D502	8-719-404-46	DIODE MA110
D503	8-719-404-46	DIODE MA110
D504	8-719-404-46	DIODE MA110

IC

IC301	8-759-946-00	IC MB88341PFV
IC401	8-752-038-XX	IC CXA1392R
IC501	8-759-037-58	IC MC68HC11E9FUSC400217
IC502	8-759-008-95	IC MC14028BF
IC504	8-759-946-00	IC MB88341PFV
IC505	8-759-998-96	IC LM324DR
IC507	8-759-030-74	IC SC14S66F
IC508	8-759-937-56	IC S-8054ALB-LM-S
IC509	8-759-932-54	IC MC14066BF
IC510	8-759-998-96	IC LM324DR
IC651	8-759-981-82	IC RC3414M
IC652	8-759-037-20	IC MPC1737M
IC653	8-759-998-98	IC LM358DR
IC655	8-759-009-07	IC MC14053BF
IC656	8-759-998-96	IC LM324DR

TRANSISTOR

Q301	8-729-905-23	TRANSISTOR 2SA1576-R
Q302	8-729-905-23	TRANSISTOR 2SA1576-R
Q303	8-729-402-84	TRANSISTOR XN4601
Q401	8-729-402-84	TRANSISTOR XN4601
Q402	8-729-402-84	TRANSISTOR XN4601
Q403	8-729-905-23	TRANSISTOR 2SA1576-R
Q404	8-729-905-35	TRANSISTOR 2SC4081-R
Q501	8-729-420-50	TRANSISTOR UN5215
Q502	8-729-420-50	TRANSISTOR UN5215
Q503	8-729-420-50	TRANSISTOR UN5215
Q504	8-729-403-10	TRANSISTOR XN6215
Q505	8-729-403-10	TRANSISTOR XN6215
Q506	8-729-420-07	TRANSISTOR XN6213
Q507	8-729-420-50	TRANSISTOR UN5215
Q508	8-729-402-78	TRANSISTOR XN6401
Q509	8-729-403-10	TRANSISTOR XN6215
Q510	8-729-905-35	TRANSISTOR 2SC4081-R
Q513	8-729-402-84	TRANSISTOR XN4601
Q514	8-729-905-35	TRANSISTOR 2SC4081-R
Q515	8-729-402-84	TRANSISTOR XN4601
Q516	8-729-905-35	TRANSISTOR 2SC4081-R
Q517	8-729-905-23	TRANSISTOR 2SA1576-R
Q651	8-729-905-23	TRANSISTOR 2SA1576-R
Q652	8-729-402-42	TRANSISTOR UN5213
Q653	8-729-903-48	TRANSISTOR 2SB1132-R
Q654	8-729-905-35	TRANSISTOR 2SC4081-R
Q655	8-729-905-35	TRANSISTOR 2SC4081-R
Q656	8-729-905-35	TRANSISTOR 2SC4081-R
Q657	8-729-402-84	TRANSISTOR XN4601
Q658	8-729-402-84	TRANSISTOR XN4601

DIODE

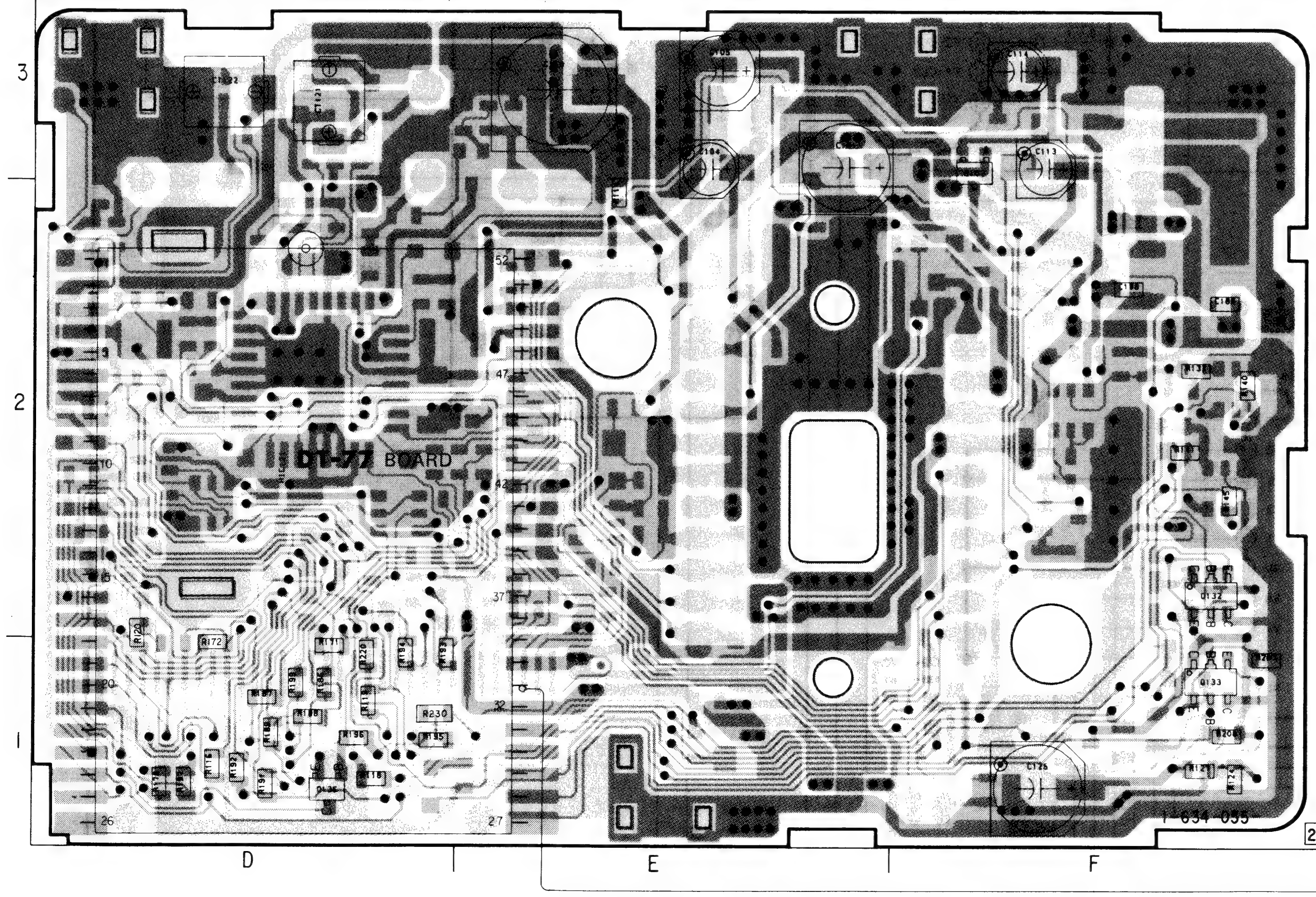
D101	8-719-404-46	DIODE MA110
D102	8-719-404-52	DIODE MA143
D122	8-719-404-46	DIODE MA110
D123	8-719-404-46	DIODE MA110
D124	8-719-404-32	DIODE MA141WA
D125	8-719-949-46	DIODE 1T32
D127	8-719-404-46	DIODE MA110
D128	8-719-404-46	DIODE MA110

IC

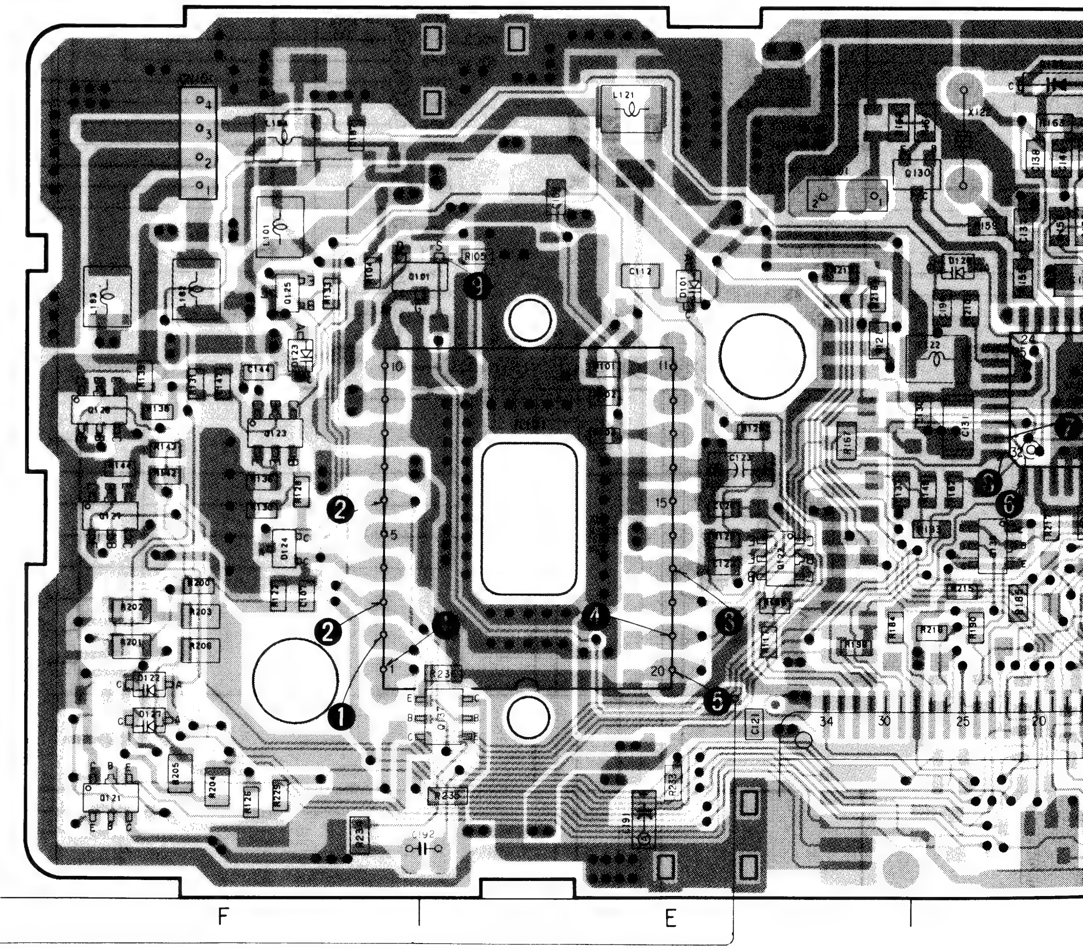
IC101	8-752-604-72	IC ICX039AN-2
IC121	8-752-326-08	IC CXD1159Q

Q101	8-765-
Q102	8-729-
Q121	8-729-
Q122	8-729-
Q123	8-729-
Q125	8-729-
Q126	8-729-
Q127	8-729-
Q129	8-729-
Q130	8-729-
Q131	8-729-
Q132	8-729-
Q133	8-729-
Q135	8-729-
Q136	8-729-
Q137	8-729-

CD-20P BOARD (COMPONENT SIDE)



CD-20P BOARD (CONDUCTOR SIDE)



Q654	8-729-905-35	TRANSISTOR	2SC4081-R
Q655	8-729-905-35	TRANSISTOR	2SC4081-R
Q656	8-729-905-35	TRANSISTOR	2SC4081-R
Q657	8-729-402-84	TRANSISTOR	XN4601
Q658	8-729-402-84	TRANSISTOR	XN4601

DIODE

D101	8-719-404-46	DIODE	MA110
D102	8-719-404-52	DIODE	MA143
D122	8-719-404-46	DIODE	MA110
D123	8-719-404-46	DIODE	MA110
D124	8-719-404-32	DIODE	MA141WA
D125	8-719-949-46	DIODE	1T32
D127	8-719-404-46	DIODE	MA110
D128	8-719-404-46	DIODE	MA110

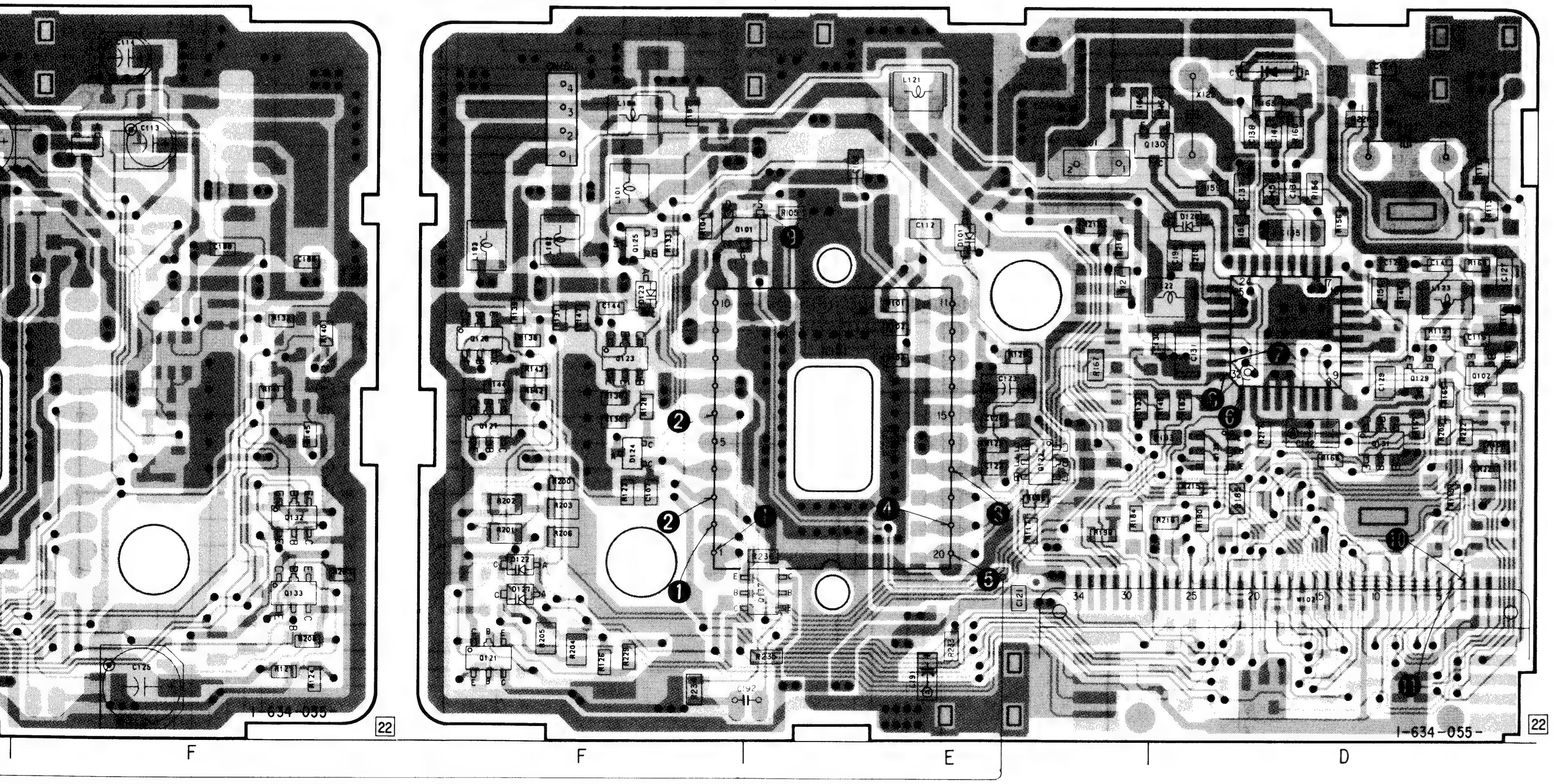
IC

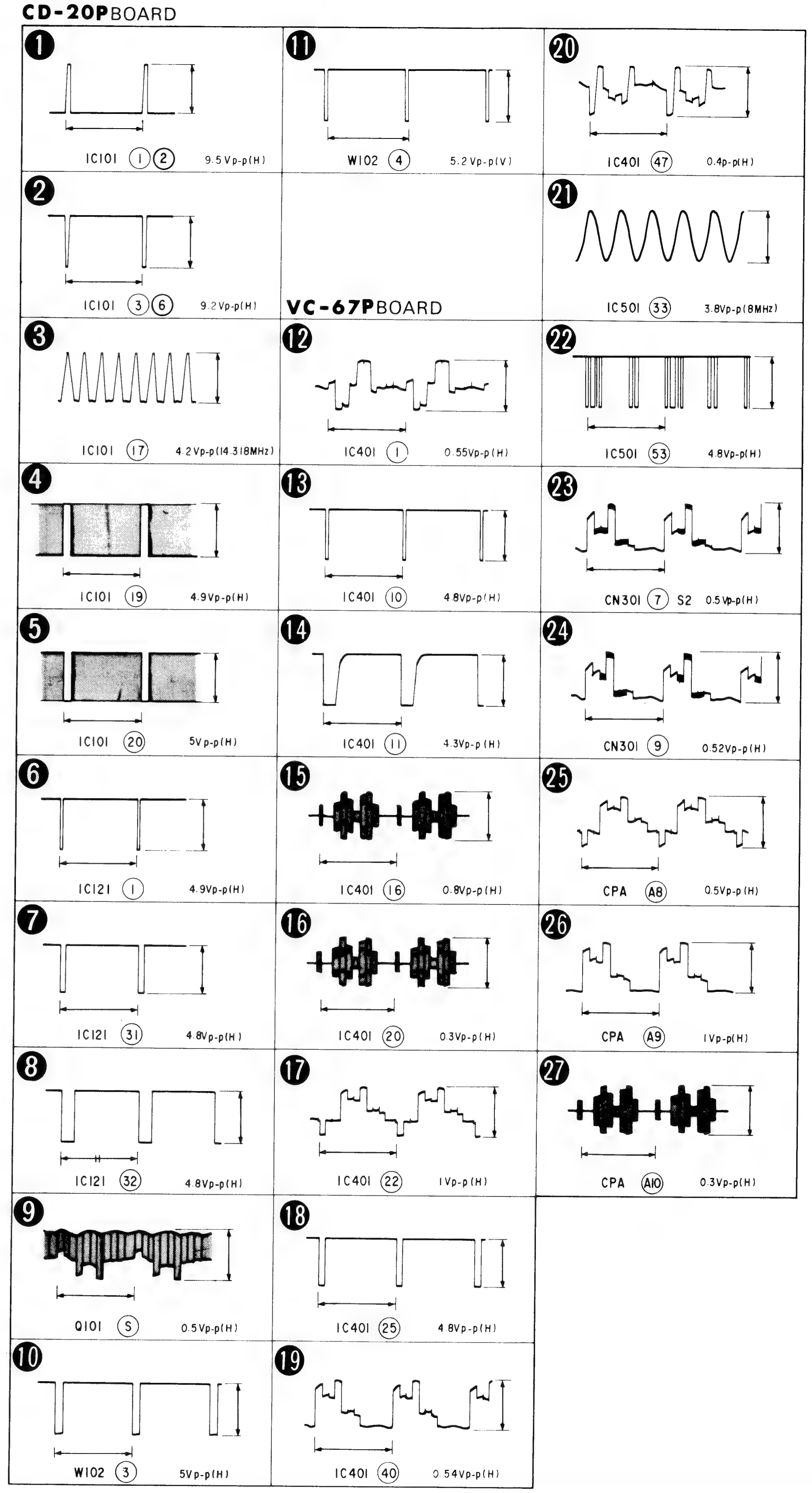
IC101	8-752-604-72	IC	ICX039AN-2
IC121	8-752-326-08	IC	CXD1159Q

TRANSISTOR

Q101	8-765-420-02	TRANSISTOR	2SK300-3
Q102	8-729-905-35	TRANSISTOR	2SC4081-R
Q121	8-729-402-84	TRANSISTOR	XN4601
Q122	8-729-402-78	TRANSISTOR	XN6401
Q123	8-729-402-19	TRANSISTOR	XN6501
Q125	8-729-905-35	TRANSISTOR	2SC4081-R
Q126	8-729-402-84	TRANSISTOR	XN4601
Q127	8-729-402-84	TRANSISTOR	XN4601
Q129	8-729-905-23	TRANSISTOR	2SA1576-R
Q130	8-729-905-35	TRANSISTOR	2SC4081-R
Q131	8-729-402-84	TRANSISTOR	XN4601
Q132	8-729-402-84	TRANSISTOR	XN4601
Q133	8-729-402-84	TRANSISTOR	XN4601
Q135	8-729-402-84	TRANSISTOR	XN4601
Q136	8-729-402-45	TRANSISTOR	UN5212
Q137	8-729-402-84	TRANSISTOR	XN4601

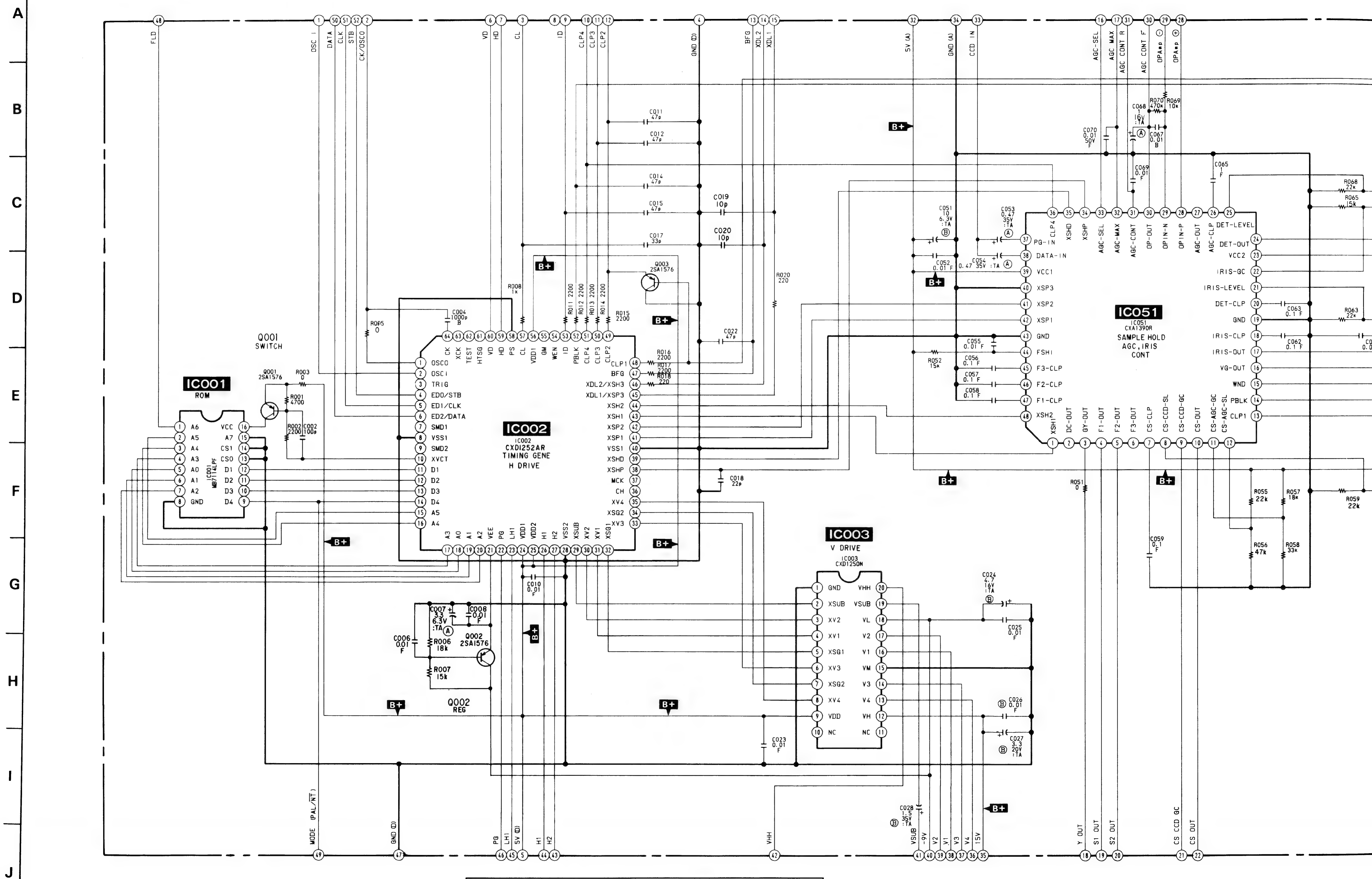
CD-20P BOARD (CONDUCTOR SIDE)





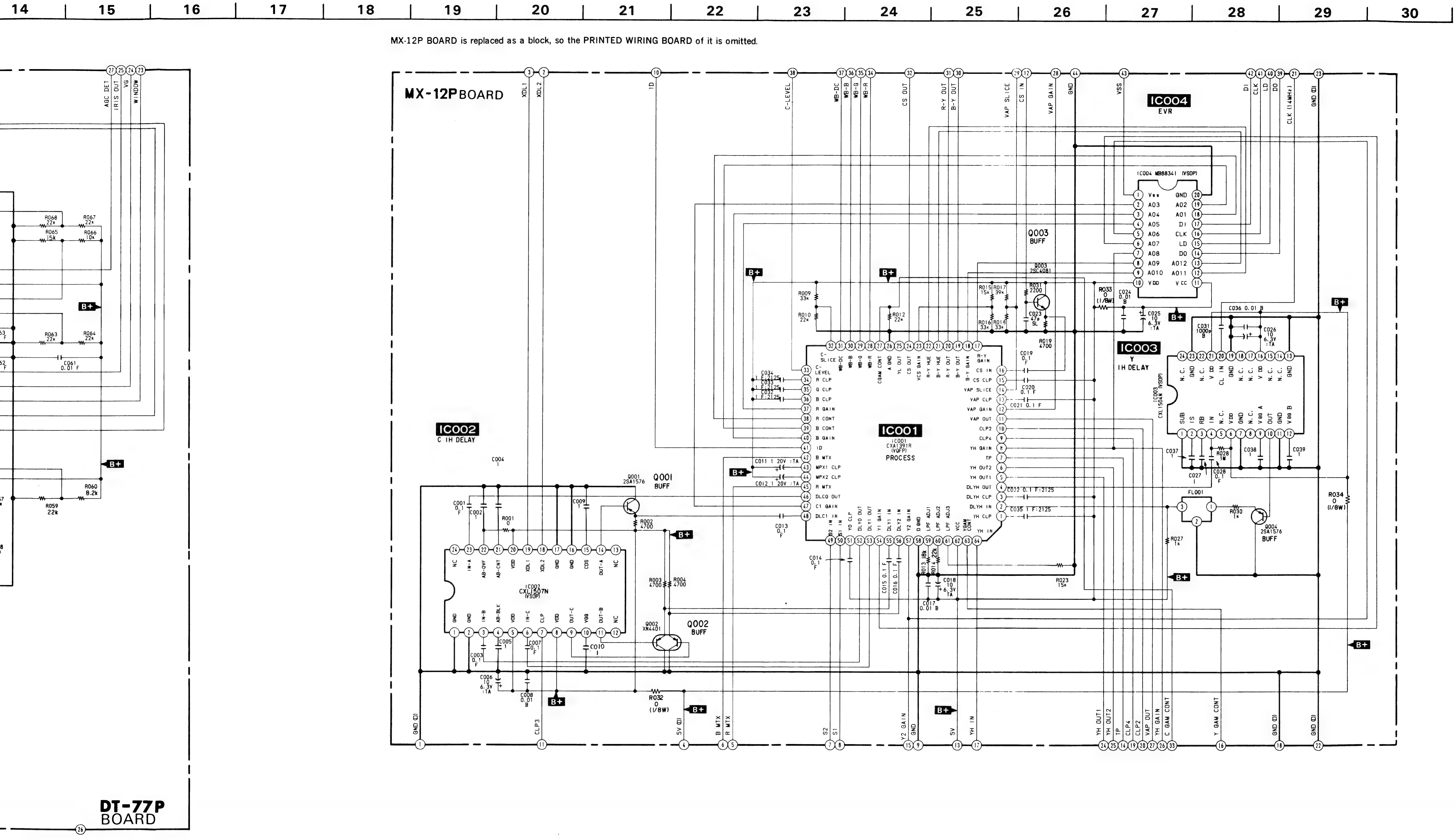
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DT-77P BOARD is replaced as a block, so the PRINTED WIRING BOARD of it is omitted.



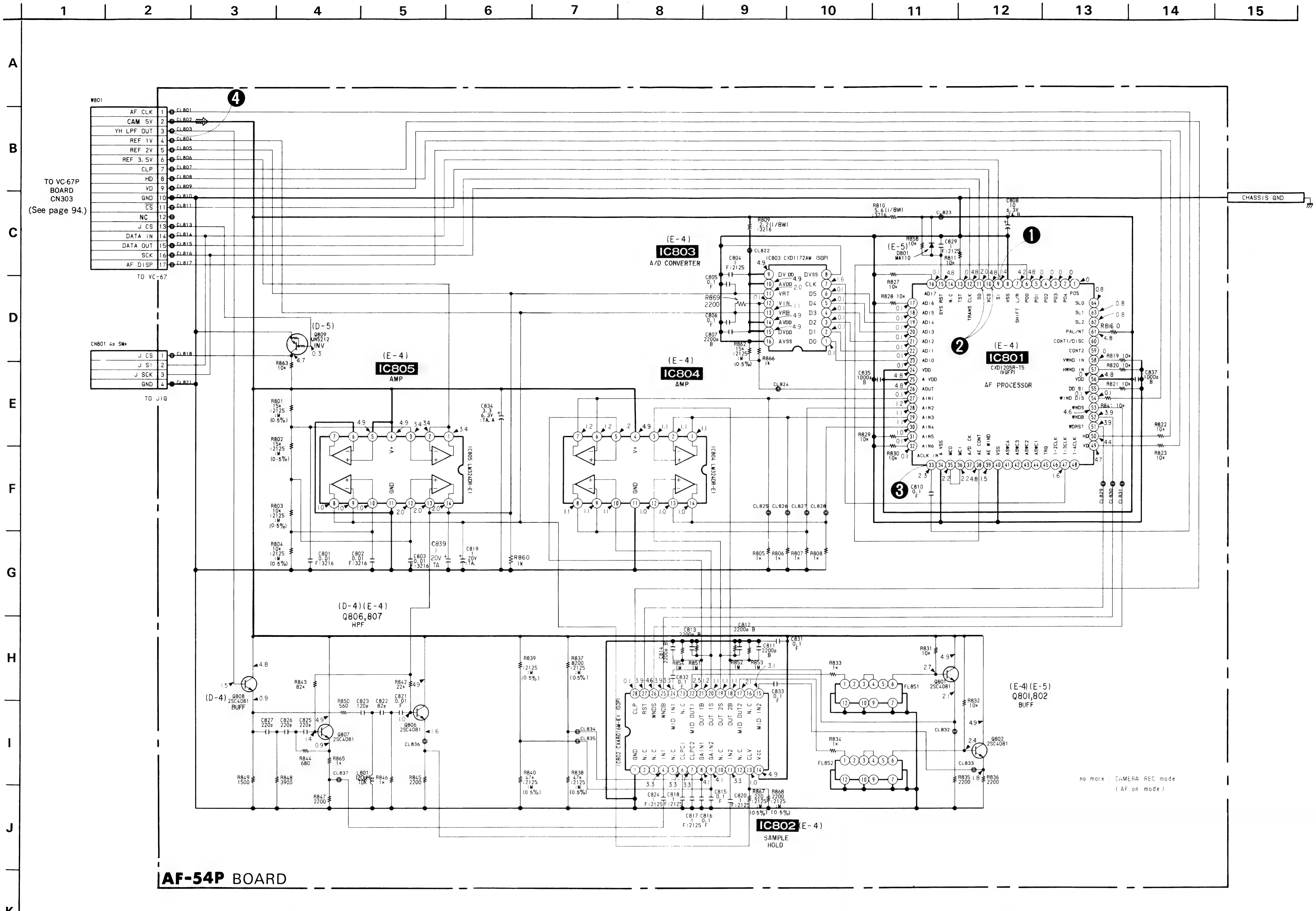
CAMERA (2)   CAMERA (2)

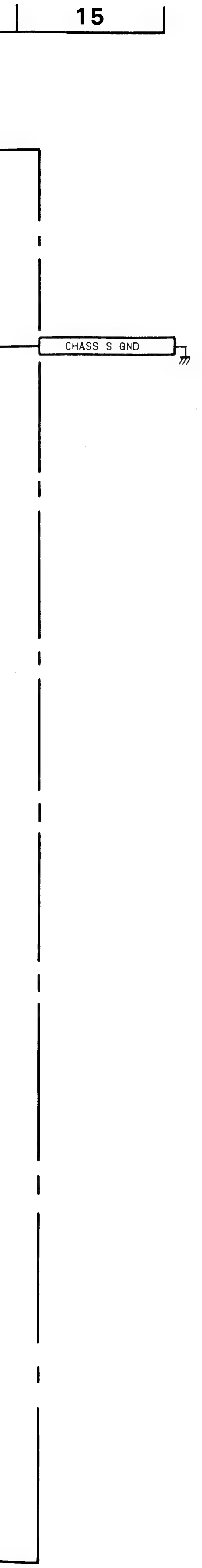
MX-12P BOARD is replaced as a block, so the PRINTED WIRING BOARD of it is omitted.



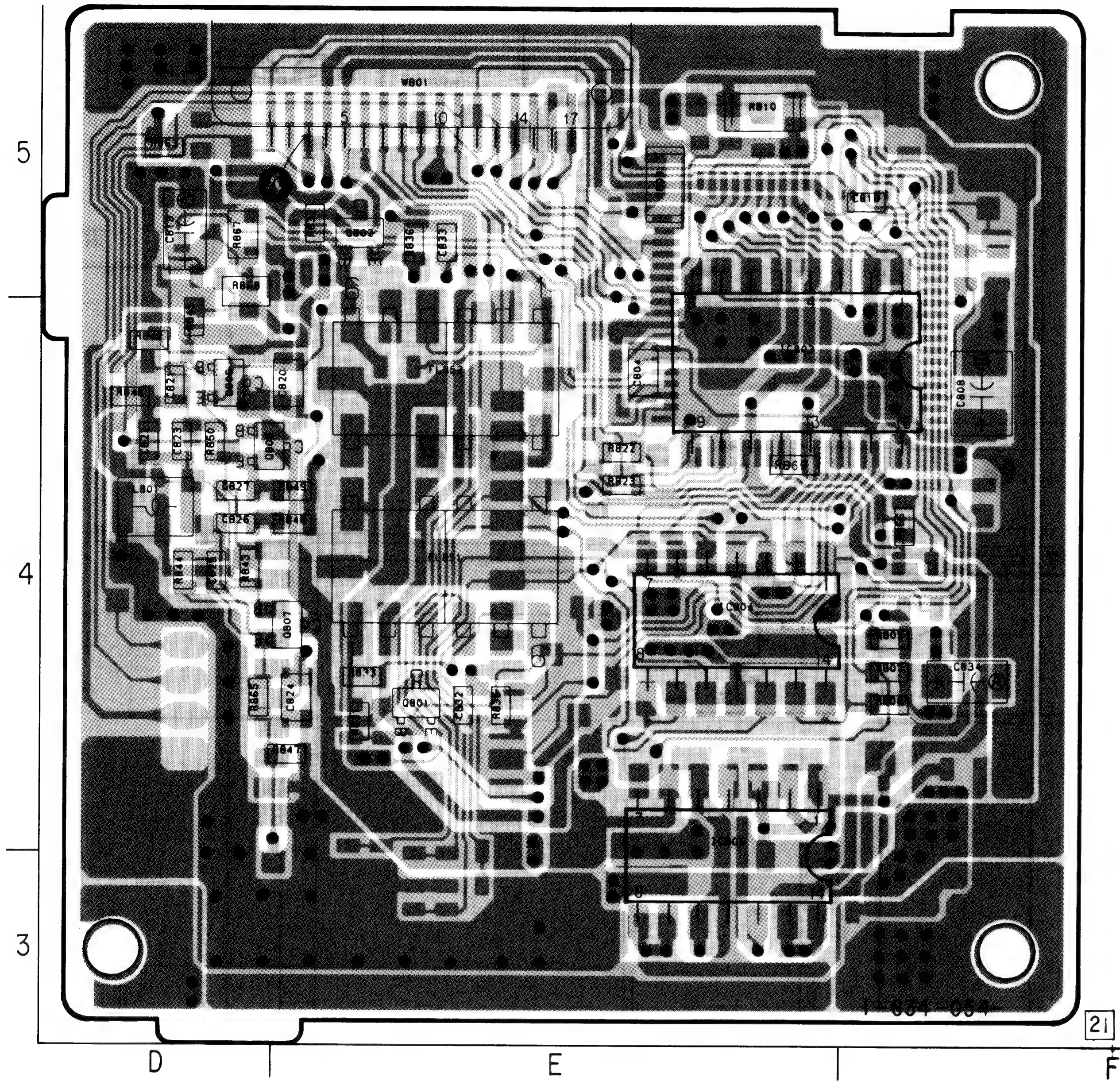
CAMERA (2) CAMERA (2)

AF-54P (AUTO FOCUS) SCHEMATIC DIAGRAM
—Ref. No. AF-54P BOARD : 3000 series—

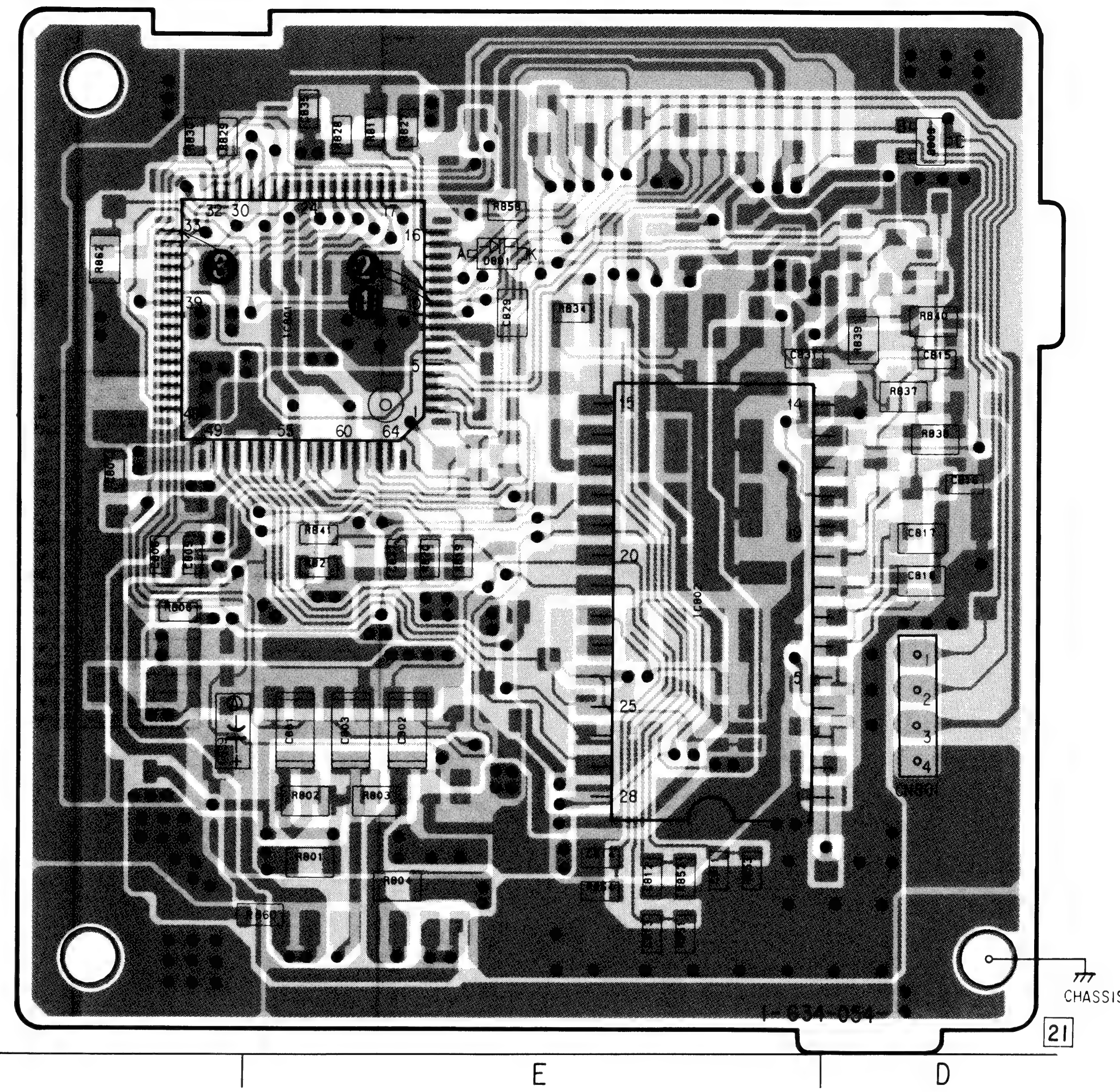




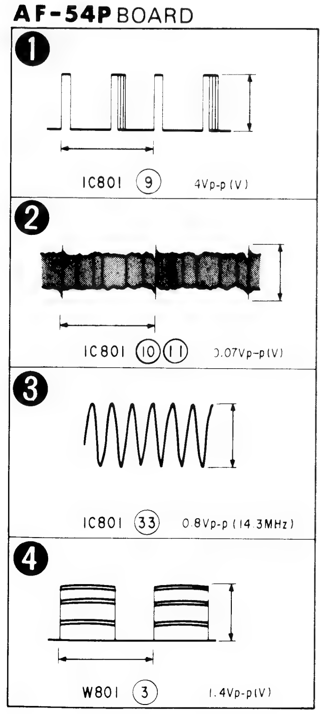
AF-54P BOARD (COMPONENT SIDE)



AF-54P BOARD (CONDUCTOR SIDE)



AF-54P BOARD



DIODE

D801	8-719-404-46	DIODE MA110

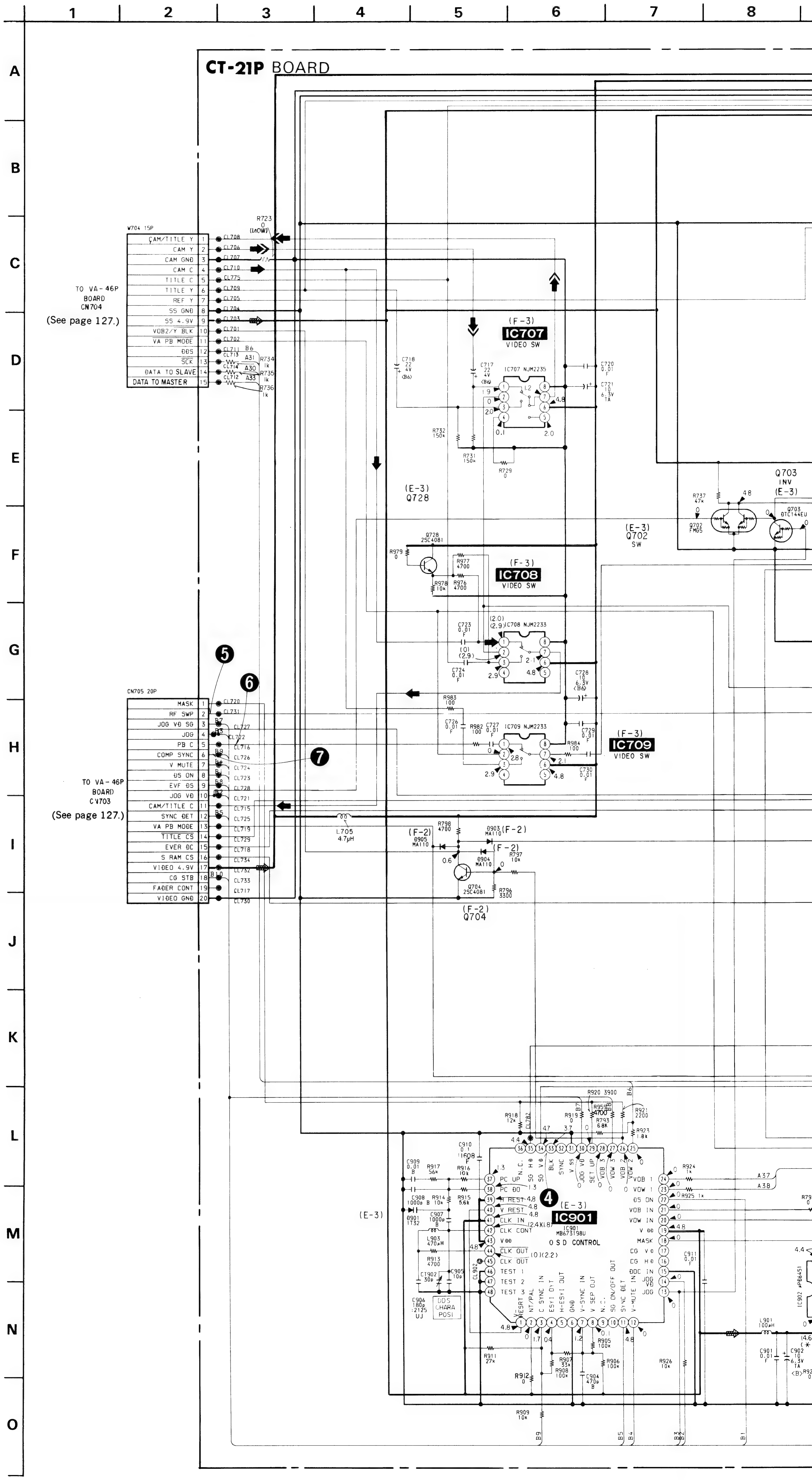
IC

IC801	8-752-334-83	IC CXD1205R
IC802	8-759-148-87	IC CXA8016M
IC803	8-752-335-65	IC CXD1172AM
IC804	8-759-998-96	IC LM324DR
IC805	8-759-998-96	IC LM324DR

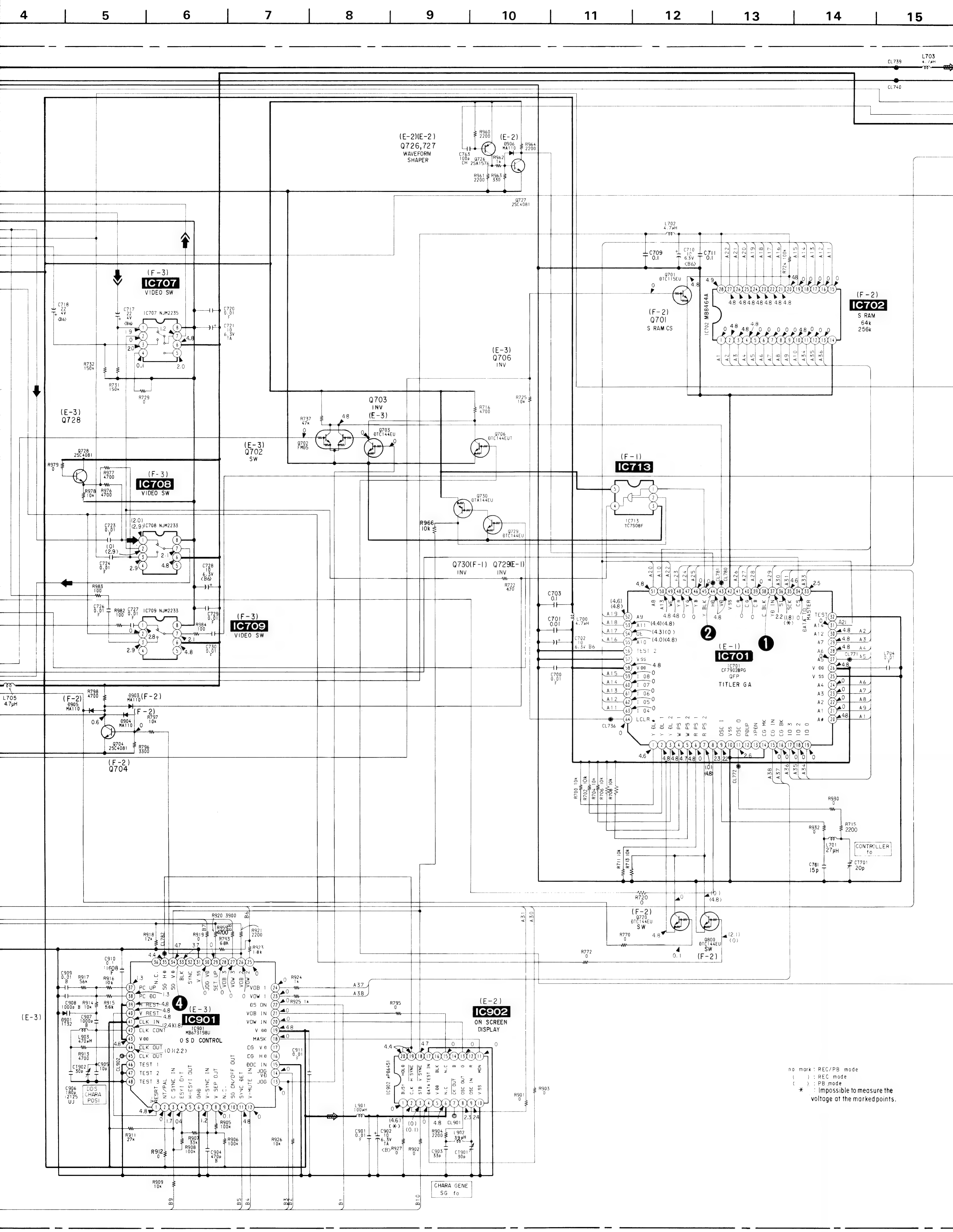
TRANSISTOR

Q801	8-729-905-35	TRANSISTOR 2SC4081-R
Q802	8-729-905-35	TRANSISTOR 2SC4081-R
Q806	8-729-905-35	TRANSISTOR 2SC4081-R
Q807	8-729-905-35	TRANSISTOR 2SC4081-R
Q808	8-729-905-35	TRANSISTOR 2SC4081-R
Q809	8-729-402-45	TRANSISTOR UN5212

CT-21P (DIGITAL TITLE) SCHEMATIC DIAGRAM
—Ref. No. CT-21P BOARD: 1000 series—

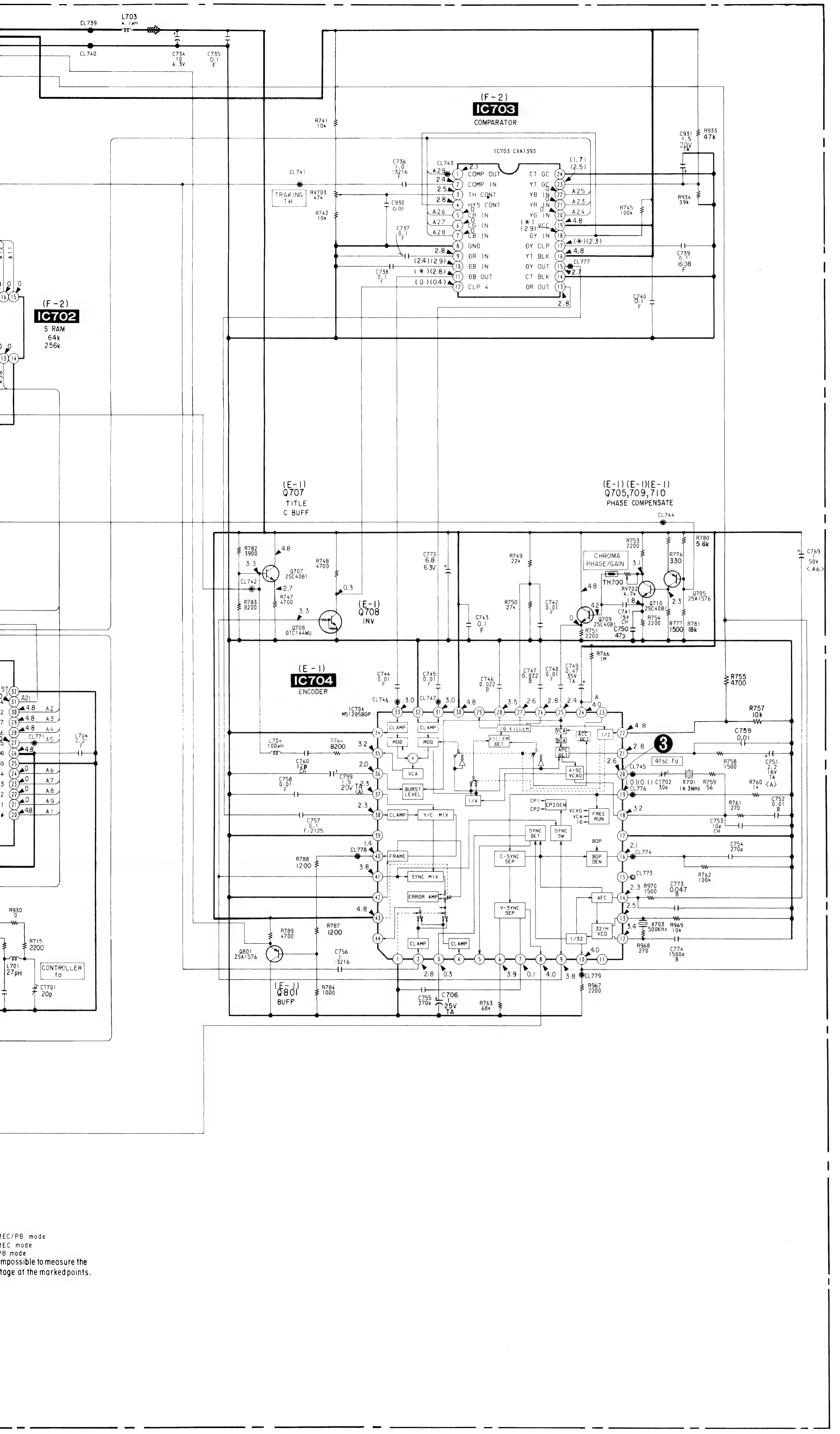


TITLE TITLE

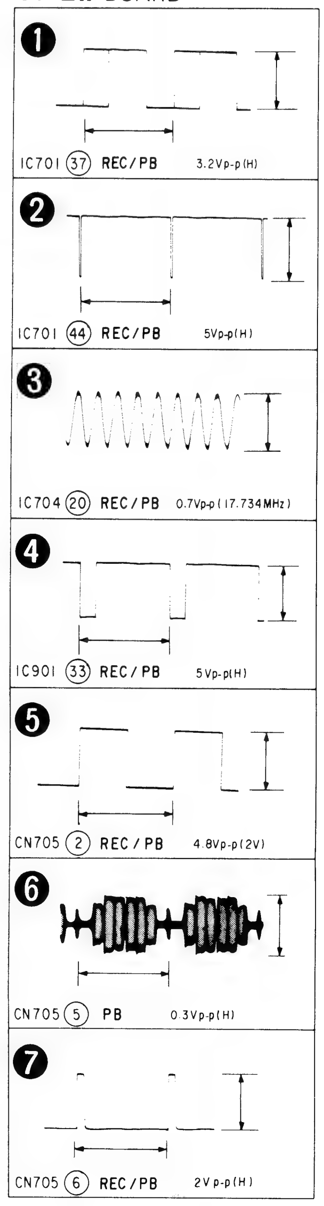

4 5 6 7 8 9 10 11 12 13 14 15
(E-2)(E-2) Q726,727 WAVEFORM SHAPER
(F-3) IC707 VIDEO SW
(F-3) IC708 VIDEO SW
(F-3) IC709 VIDEO SW
(E-3) Q728
(E-3) Q702 SW
(E-3) Q706 INV
Q703 INV (E-3)
(F-2) Q704
(F-2) Q701 S RAM CS
(F-2) IC702 S RAM 64k 256k
(F-1) IC713
Q730(F-1) INV
Q729(E-1) INV
(E-1) IC701 CF79028PG QFP TITLER GA
(E-3) IC901 MB67319BU OSD CONTROL
(E-2) IC902 ON SCREEN DISPLAY
(F-2) Q720 SW
Q800 SW (F-2)
CONTROLLER fo
DDS CHARA POSI
CHARA GENE SG fo
no mark : REC/PB mode
( ) : REC mode
< > : PB mode
* : Impossible to measure the voltage at the marked points.

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14	15	16	17	18	19	20	21	22



CT-21P BOARD



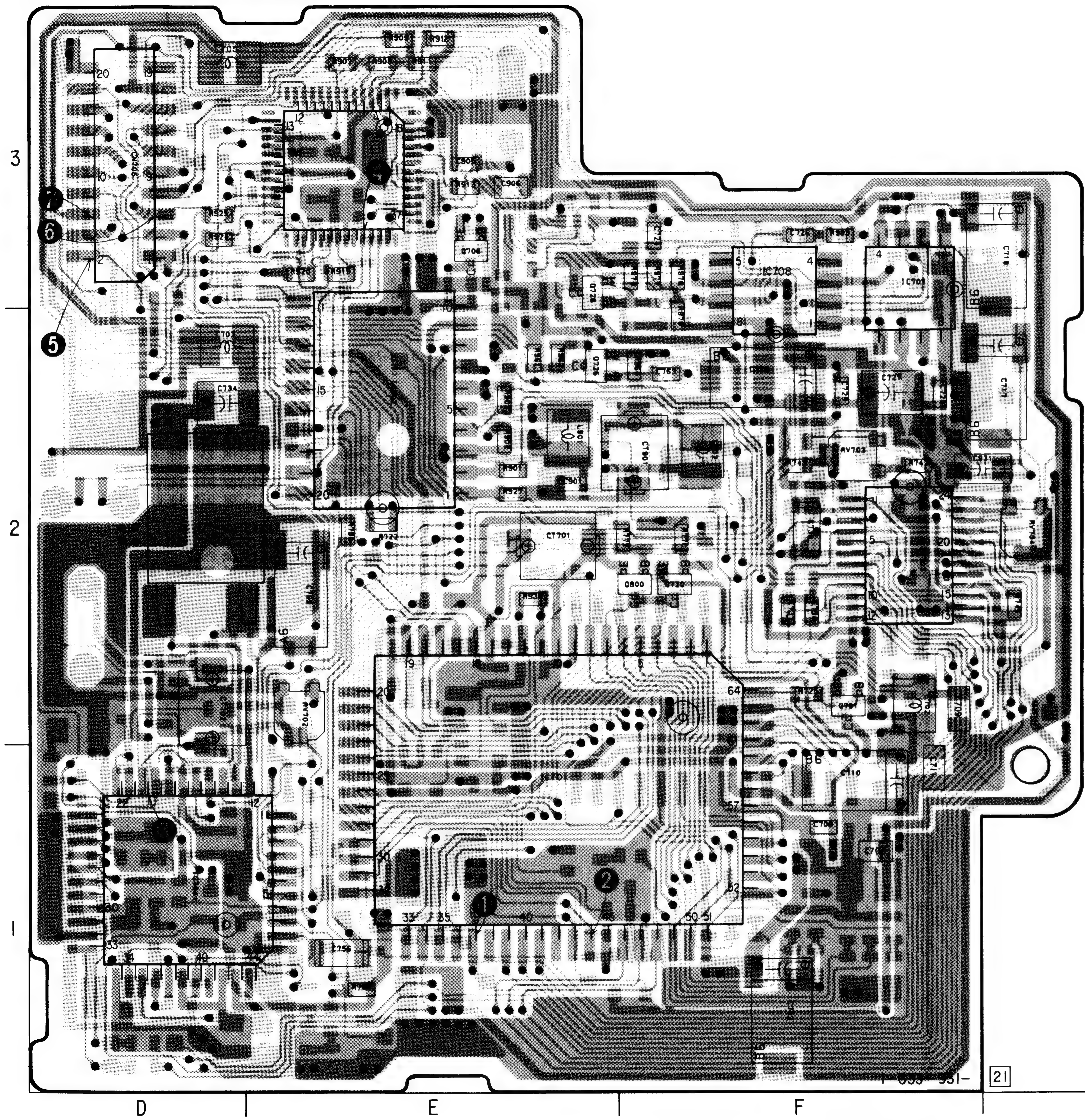
• Signal path

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡	➡
PB	⇨	⇨	⇨

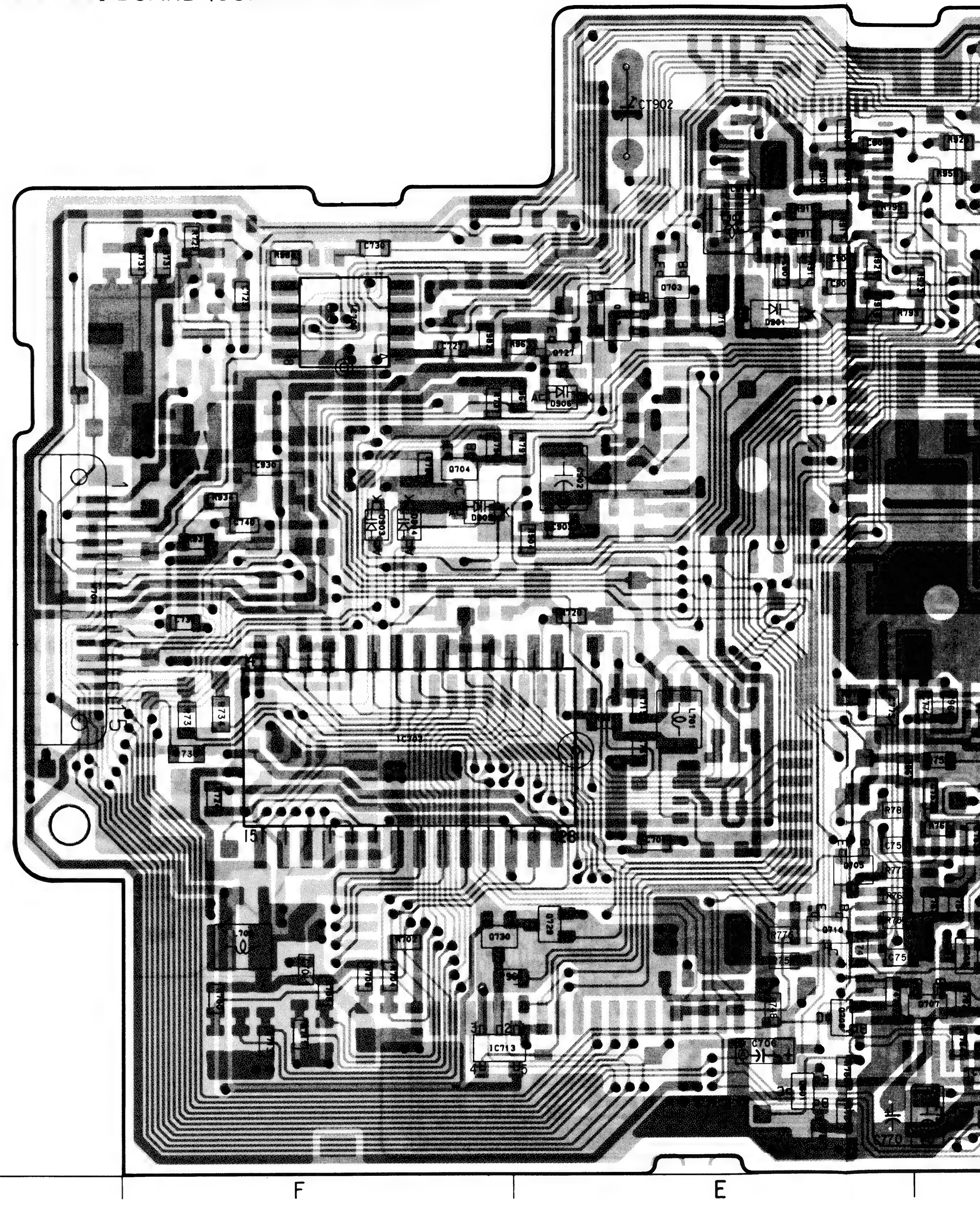
TITLE TITLE

CT-21P (DIGITAL TITLE) PRINTED WIRING BOARD
—Ref. No. CT-21P BOARD: 1000 series—

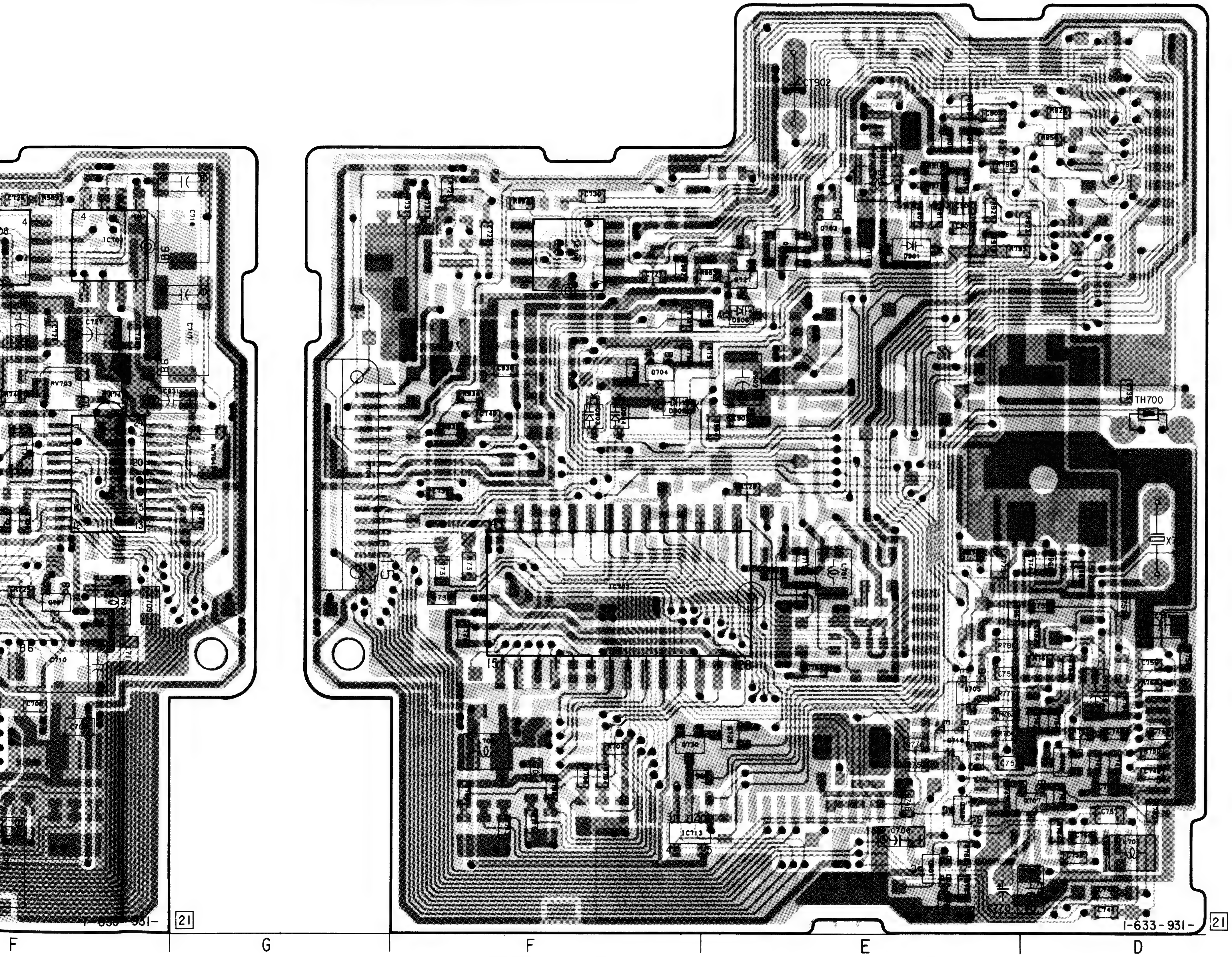
CT-21P BOARD (COMPONENT SIDE)



CT-21PBOARD (CONDUCTOR SIDE)



CT-21P BOARD (CONDUCTOR SIDE)



DIODE

D901	8-719-949-46	DIODE 1T32
D903	8-719-404-46	DIODE MA110
D904	8-719-404-46	DIODE MA110
D905	8-719-404-46	DIODE MA110
D906	8-719-404-46	DIODE MA110

IC

IC701	8-759-998-30	IC CF79028PG
IC702	8-752-336-85	IC CXK58257M-10L-T5
IC703	8-752-039-49	IC CXA1393AN
IC704	8-759-634-47	IC M51285BGP
IC707	8-759-710-29	IC NJM2235M
IC708	8-759-710-86	IC NJM2233BM
IC709	8-759-710-86	IC NJM2233BM
IC713	8-759-234-20	IC TC7S08F
IC901	8-759-970-80	IC MB673198U
IC902	8-759-151-18	IC UPD6451G

TRANSISTOR

Q701	8-729-925-91	TRANSISTOR DTC115EU
Q702	8-729-907-03	TRANSISTOR FMG5
Q703	8-729-905-18	TRANSISTOR DTC144EU
Q704	8-729-905-35	TRANSISTOR 2SC4081-R
Q705	8-729-905-23	TRANSISTOR 2SA1576-R
Q706	8-729-905-18	TRANSISTOR DTC144EU
Q707	8-729-905-35	TRANSISTOR 2SC4081-R
Q708	8-729-905-15	TRANSISTOR DTC144WU
Q709	8-729-905-35	TRANSISTOR 2SC4081-R
Q710	8-729-905-35	TRANSISTOR 2SC4081-R
Q720	8-729-905-18	TRANSISTOR DTC144EU
Q726	8-729-905-23	TRANSISTOR 2SA1576-R
Q727	8-729-905-35	TRANSISTOR 2SC4081-R
Q728	8-729-905-35	TRANSISTOR 2SC4081-R
Q729	8-729-905-18	TRANSISTOR DTC144EU
Q730	8-729-905-12	TRANSISTOR DTA144EU
Q800	8-729-905-18	TRANSISTOR DTC144EU
Q801	8-729-905-23	TRANSISTOR 2SA1576-R

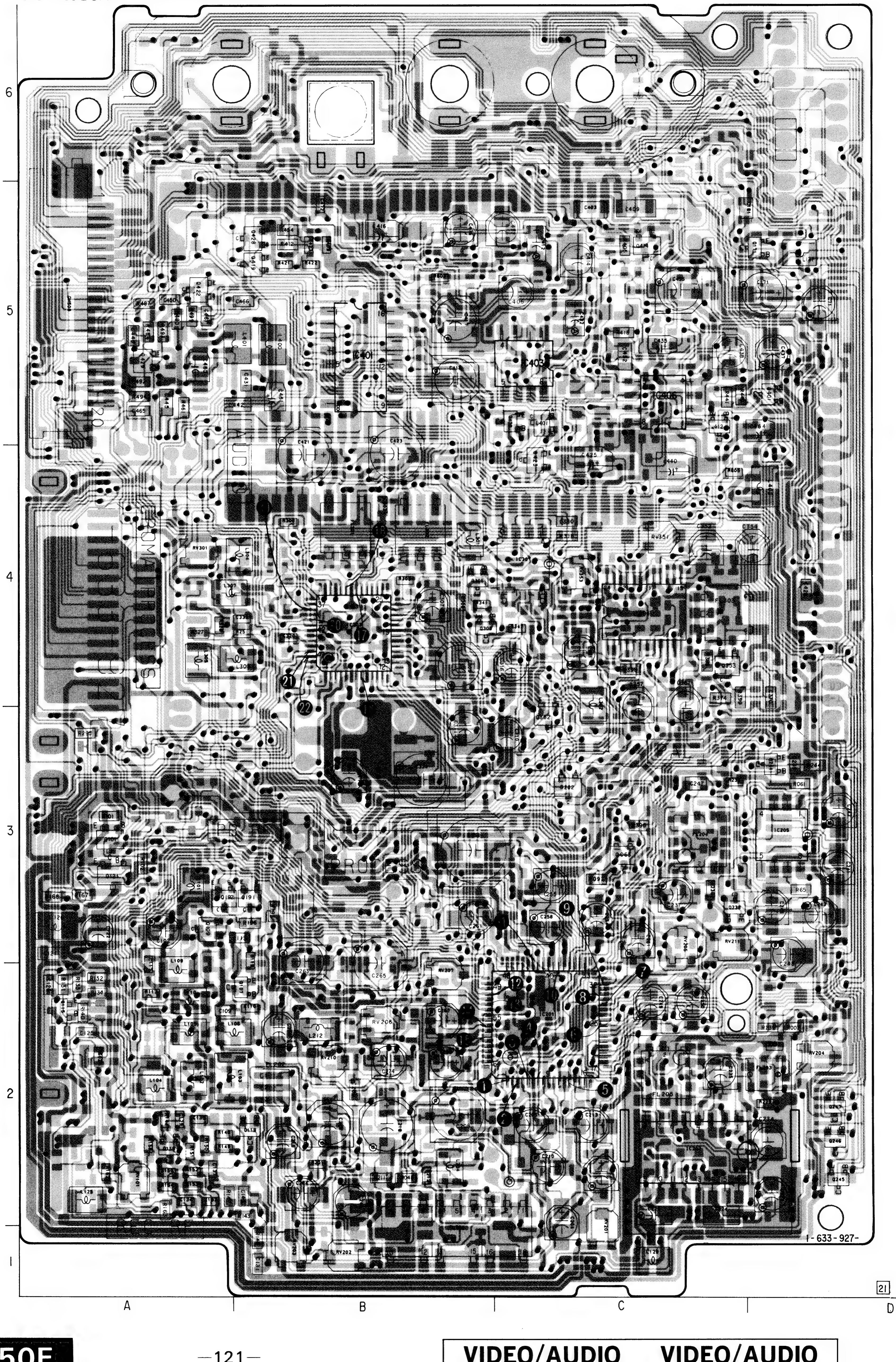
http://www.ManualsCenter.com

DIODE			
D101	8-719-800-76	DIODE	1SS123
D202	8-719-941-86	DIODE	DAN202U
D203	8-719-941-86	DIODE	DAN202U
D204	8-719-404-46	DIODE	MA110
D205	8-719-941-86	DIODE	DAN202U
D207	8-719-941-86	DIODE	DAN202U
D208	8-719-941-86	DIODE	DAN202U
D209	8-719-941-86	DIODE	DAN202U
D210	8-719-404-46	DIODE	MA110
D211	8-719-941-86	DIODE	DAN202U
D212	8-719-941-86	DIODE	DAN202U
D214	8-719-940-45	DIODE	MA159
D215	8-719-404-46	DIODE	MA110
D216	8-719-404-46	DIODE	MA110
D351	8-719-404-46	DIODE	MA110
D401	8-719-941-86	DIODE	DAN202U
D406	8-719-404-46	DIODE	MA110
D408	8-719-941-86	DIODE	DAN202U

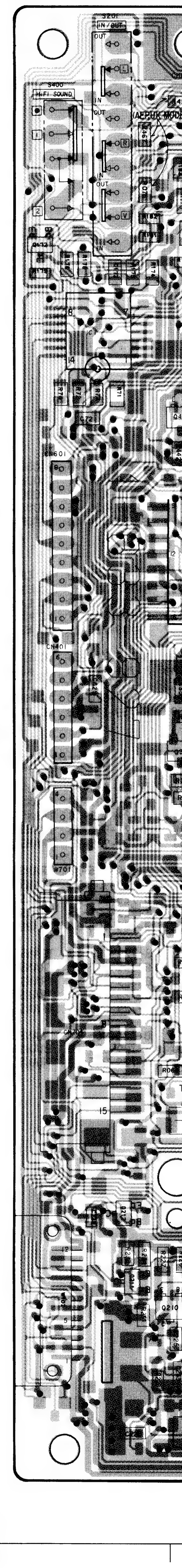
IC			
IC001	8-759-999-02	IC	TL1596CDS
IC101	8-759-012-00	IC	MC10H116M
IC201	8-752-036-19	IC	CXA1207R
IC202	8-752-335-88	IC	CXL1506M
IC203	8-752-036-20	IC	CXA1208R
IC204	8-759-605-61	IC	CXA1203N
IC205	8-759-710-29	IC	NJM2235M
IC206	8-759-322-02	IC	HA118070F
IC207	8-759-710-07	IC	NJM2234M
IC400	8-741-100-98	IC	SBX1506-2
IC401	8-759-103-25	IC	UPD4053BG
IC402	8-759-100-94	IC	UPC358G2
IC403	8-759-100-94	IC	UPC358G2
IC404	8-752-334-42	IC	CXD2106Q
IC406	8-759-981-82	IC	NJM3414M
IC407	8-759-009-22	IC	MC14094BF

MC-44P (MIC), SW-121P (SWITCH, JACK), VA-46P (VIDEO/AUDIO) PRINTED WIRING BOARDS
—Ref. No. MC-44P BOARD: 2000 series, SW-121P, VA-46P BOARDS: 3000 series—

VA-46PBOARD (COMPONENT SIDE)



VA-46PBOARD (C

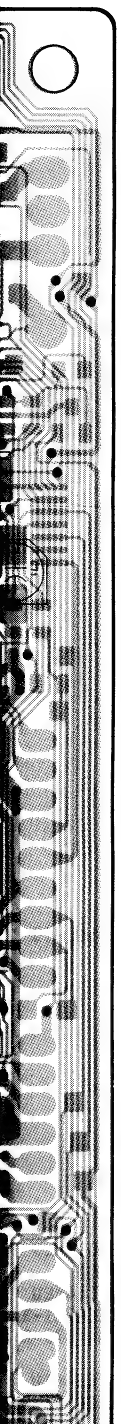


IC

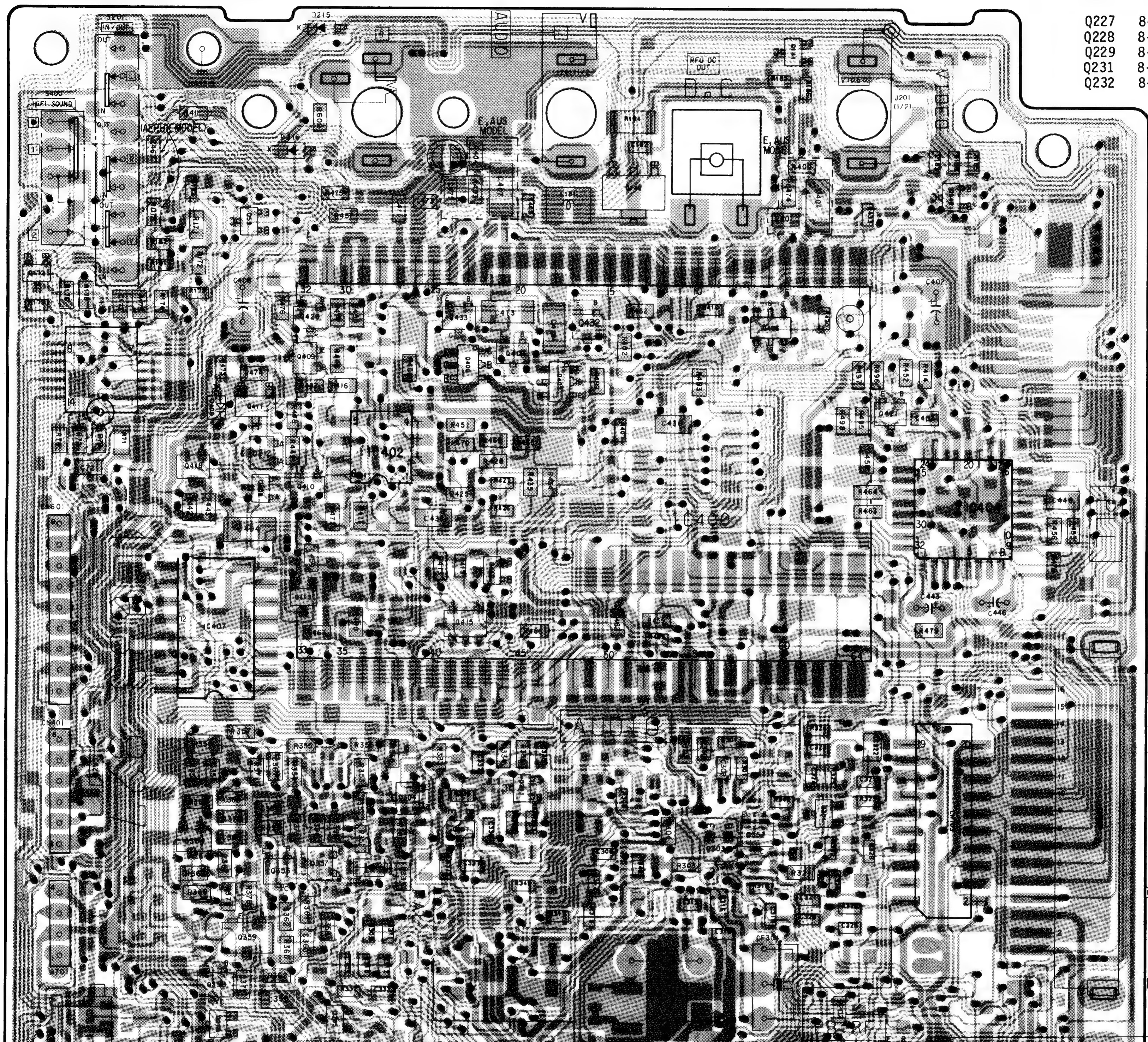
Ref. No.	Part No.	Description
IC001	8-759-999-02	IC TL1596CDSB
IC101	8-759-012-00	IC MC10H116M
IC201	8-752-036-19	IC CXA1207R
IC202	8-752-335-88	IC CXL1506M
IC203	8-752-036-20	IC CXA1208R
IC204	8-759-605-61	IC CXA1203N
IC205	8-759-710-29	IC NJM2235M
IC206	8-759-322-02	IC HA11807OFPTR
IC207	8-759-710-07	IC NJM2234M
IC400	8-741-100-98	IC SBX1506-21
IC401	8-759-103-25	IC UPD4053BG
IC402	8-759-100-94	IC UPC358G2
IC403	8-759-100-94	IC UPC358G2
IC404	8-752-334-42	IC CXD2106Q
IC406	8-759-981-82	IC NJM3414M
IC407	8-759-009-22	IC MC14094BF

TRANSISTOR

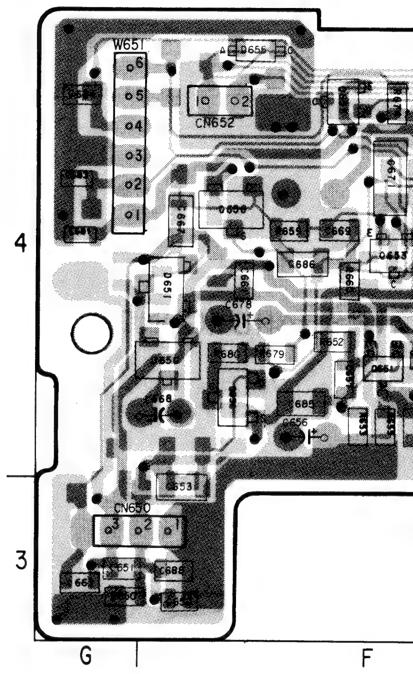
Ref. No.	Part No.	Description
Q001	8-729-905-23	TRANSISTOR 2SA1576-R
Q002	8-729-905-35	TRANSISTOR 2SC4081-R
Q004	8-729-905-35	TRANSISTOR 2SC4081-R
Q005	8-729-905-35	TRANSISTOR 2SC4081-R
Q059	8-729-905-18	TRANSISTOR DTC144EU
Q060	8-729-905-18	TRANSISTOR DTC144EU
Q061	8-729-905-18	TRANSISTOR DTC144EU
Q062	8-729-905-18	TRANSISTOR DTC144EU
Q063	8-729-905-12	TRANSISTOR DTA144EU
Q101	8-729-905-23	TRANSISTOR 2SA1576-R
Q102	8-729-905-18	TRANSISTOR DTC144EU
Q103	8-729-905-23	TRANSISTOR 2SA1576-R
Q105	8-729-905-35	TRANSISTOR 2SC4081-R
Q106	8-729-102-07	TRANSISTOR 2SC2223-F13
Q107	8-729-905-12	TRANSISTOR DTA144EU
Q109	8-729-905-35	TRANSISTOR 2SC4081-R
Q110	8-729-905-18	TRANSISTOR DTC144EU
Q115	8-729-905-35	TRANSISTOR 2SC4081-R
Q117	8-729-905-35	TRANSISTOR 2SC4081-R
Q118	8-729-905-23	TRANSISTOR 2SA1576-R
Q119	8-729-905-35	TRANSISTOR 2SC4081-R
Q121	8-729-141-48	TRANSISTOR 2SB624-BV345
Q122	8-729-102-07	TRANSISTOR 2SC2223-F13
Q123	8-729-905-35	TRANSISTOR 2SC4081-R
Q140	8-729-905-12	TRANSISTOR DTA144EU
Q141	8-729-905-35	TRANSISTOR 2SC4081-R
Q142	8-729-140-73	TRANSISTOR 2SB798-DL
Q154	8-729-905-35	TRANSISTOR 2SC4081-R
Q171	8-729-905-35	TRANSISTOR 2SC4081-R
Q172	8-729-905-35	TRANSISTOR 2SC4081-R
Q191	8-729-905-35	TRANSISTOR 2SC4081-R
Q192	8-729-905-18	TRANSISTOR DTC144EU
Q195	8-729-905-12	TRANSISTOR DTA144EU
Q196	8-729-905-18	TRANSISTOR DTC144EU
Q201	8-729-905-35	TRANSISTOR 2SC4081-R
Q202	8-729-905-12	TRANSISTOR DTA144EU
Q203	8-729-905-23	TRANSISTOR 2SA1576-R
Q204	8-729-905-35	TRANSISTOR 2SC4081-R
Q205	8-729-202-38	TRANSISTOR 2SC3326N
Q206	8-729-905-35	TRANSISTOR 2SC4081-R
Q209	8-729-905-18	TRANSISTOR DTC144EU
Q210	8-729-905-23	TRANSISTOR 2SA1576-R
Q211	8-729-905-35	TRANSISTOR 2SC4081-R
Q212	8-729-905-35	TRANSISTOR 2SC4081-R
Q213	8-729-904-07	TRANSISTOR FMG2
Q215	8-729-905-23	TRANSISTOR 2SA1576-R
Q216	8-729-905-18	TRANSISTOR DTC144EU
Q220	8-729-101-07	TRANSISTOR 2SB798-DL
Q221	8-729-905-18	TRANSISTOR DTC144EU
Q222	8-729-905-12	TRANSISTOR DTA144EU
Q223	8-729-905-35	TRANSISTOR 2SC4081-R
Q224	8-729-905-35	TRANSISTOR 2SC4081-R
Q225	8-729-905-12	TRANSISTOR DTA144EU
Q226	8-729-905-35	TRANSISTOR 2SC4081-R
Q227	8-729-905-35	TRANSISTOR 2SC4081-R
Q228	8-729-905-23	TRANSISTOR 2SA1576-R
Q229	8-729-905-35	TRANSISTOR 2SC4081-R
Q231	8-729-905-35	TRANSISTOR 2SC4081-R
Q232	8-729-905-35	TRANSISTOR 2SC4081-R



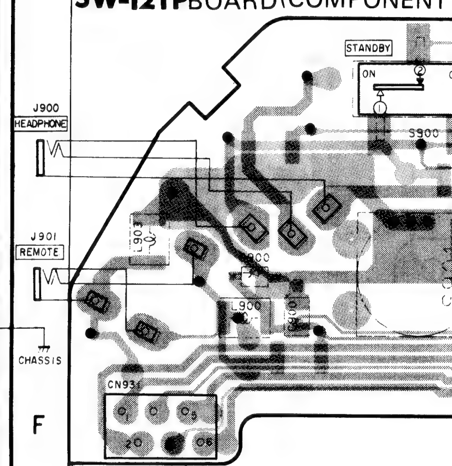
VA-46P BOARD (CONDUCTOR SIDE)



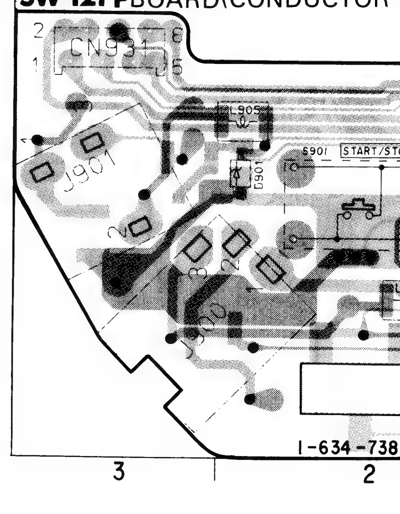
MC-44P BOARD (CONDUCTO



SW-121P BOARD (COMPONENT



SW-121 P BOARD (CONDUCTOR

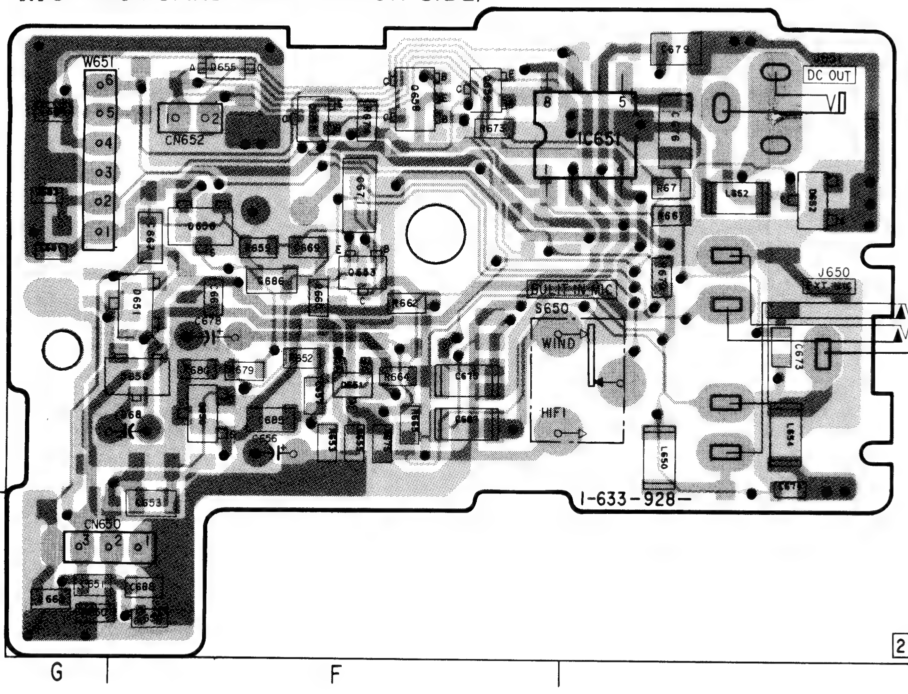


-729-905-35	TRANSISTOR 2SC4081-R
-729-905-12	TRANSISTOR DTA144EU
-729-905-23	TRANSISTOR 2SA1576-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-202-38	TRANSISTOR 2SC3326N
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-18	TRANSISTOR DTC144EU
-729-905-23	TRANSISTOR 2SA1576-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-904-07	TRANSISTOR FMG2
-729-905-23	TRANSISTOR 2SA1576-R
-729-905-18	TRANSISTOR DTC144EU
-729-101-07	TRANSISTOR 2SB798-DL
-729-905-18	TRANSISTOR DTC144EU
-729-905-12	TRANSISTOR DTA144EU
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-12	TRANSISTOR DTA144EU
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-23	TRANSISTOR 2SA1576-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-35	TRANSISTOR 2SC4081-R
-729-905-35	TRANSISTOR 2SC4081-R

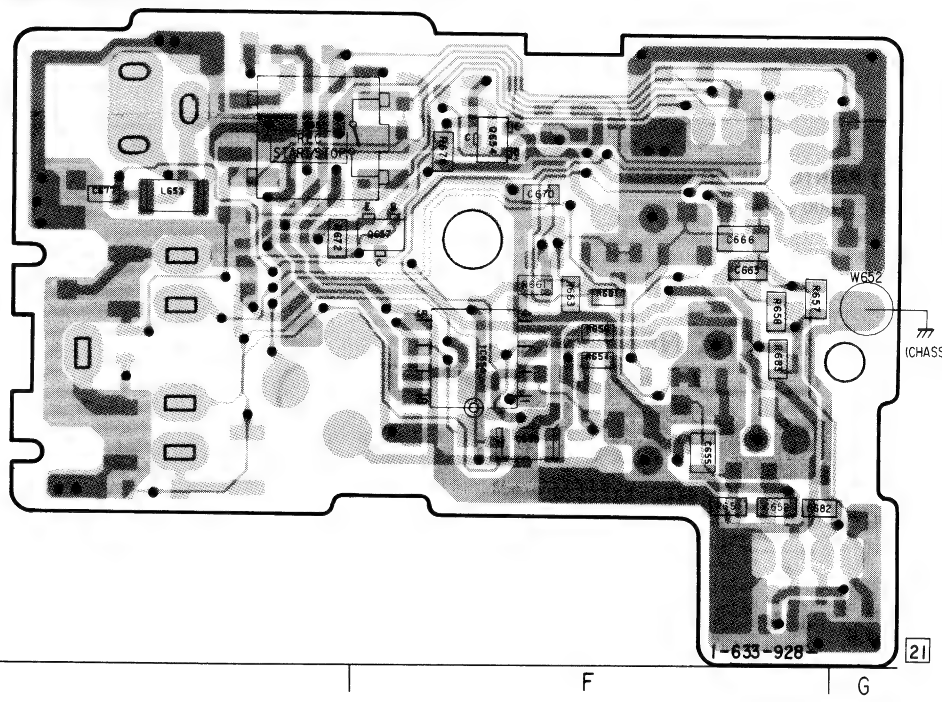
Q238	8-729-905-23	TRANSISTOR 2SA1576-R
Q240	8-729-905-35	TRANSISTOR 2SC4081-R
Q241	8-729-905-23	TRANSISTOR 2SA1576-R
Q244	8-729-905-18	TRANSISTOR DTC144EU
Q245	8-729-905-XX	TRANSISTOR DTC114TU
Q246	8-729-905-XX	TRANSISTOR DTC114TU
Q247	8-729-905-XX	TRANSISTOR DTC114TU
Q248	8-729-905-18	TRANSISTOR DTC144EU
Q250	8-729-905-35	TRANSISTOR 2SC4081-R
Q251	8-729-905-18	TRANSISTOR DTC144EU
Q301	8-729-905-23	TRANSISTOR 2SA1576-R
Q303	8-729-905-35	TRANSISTOR 2SC4081-R
Q304	8-729-905-35	TRANSISTOR 2SC4081-R
Q306	8-729-905-35	TRANSISTOR 2SC4081-R
Q307	8-729-905-18	TRANSISTOR DTC144EU
Q308	8-729-905-12	TRANSISTOR DTA144EU
Q311	8-729-905-35	TRANSISTOR 2SC4081-R
Q351	8-729-905-35	TRANSISTOR 2SC4081-R
Q352	8-729-905-35	TRANSISTOR 2SC4081-R
Q353	8-729-905-35	TRANSISTOR 2SC4081-R
Q354	8-729-905-35	TRANSISTOR 2SC4081-R
Q356	8-729-905-18	TRANSISTOR DTC144EU
Q357	8-729-905-12	TRANSISTOR DTA144EU
Q358	8-729-905-18	TRANSISTOR DTC144EU
Q359	8-729-102-08	TRANSISTOR 2SC2223-F14
Q362	8-729-905-18	TRANSISTOR DTC144EU
Q400	8-729-907-39	TRANSISTOR IMD2
Q401	8-729-905-XX	TRANSISTOR DTC114TU

Q402	8-729-921-58	TRANSISTOR DTA144TU (E/AUS MODEL)
Q406	8-729-402-81	TRANSISTOR XN4501
Q407	8-729-907-39	TRANSISTOR IMD2
Q409	8-729-905-XX	TRANSISTOR DTC114TU
Q410	8-729-905-XX	TRANSISTOR DTC114TU
Q411	8-729-216-22	TRANSISTOR 2SA1162
Q412	8-729-905-18	TRANSISTOR DTC144EU
Q413	8-729-905-12	TRANSISTOR DTA144EU
Q414	8-729-905-18	TRANSISTOR DTC144EU
Q415	8-729-904-07	TRANSISTOR FMG2
Q417	8-729-905-18	TRANSISTOR DTC144EU
Q418	8-729-905-XX	TRANSISTOR DTC114TU
Q419	8-729-905-18	TRANSISTOR DTC144EU
Q421	8-729-905-35	TRANSISTOR 2SC4081-R
Q422	8-729-905-35	TRANSISTOR 2SC4081-R
Q423	8-729-905-18	TRANSISTOR DTC144EU
Q426	8-729-905-23	TRANSISTOR 2SA1576-R
Q428	8-729-905-18	TRANSISTOR DTC144EU
Q429	8-729-905-35	TRANSISTOR 2SC4081-R
Q430	8-729-905-18	TRANSISTOR DTC144EU
Q432	8-729-905-18	TRANSISTOR DTC144EU
Q433	8-729-905-18	TRANSISTOR DTC144EU

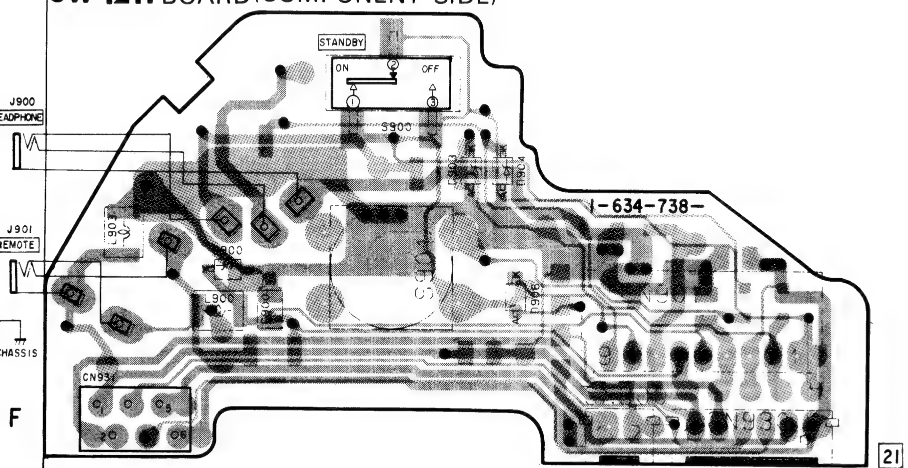
MC-44P BOARD (CONDUCTOR SIDE)



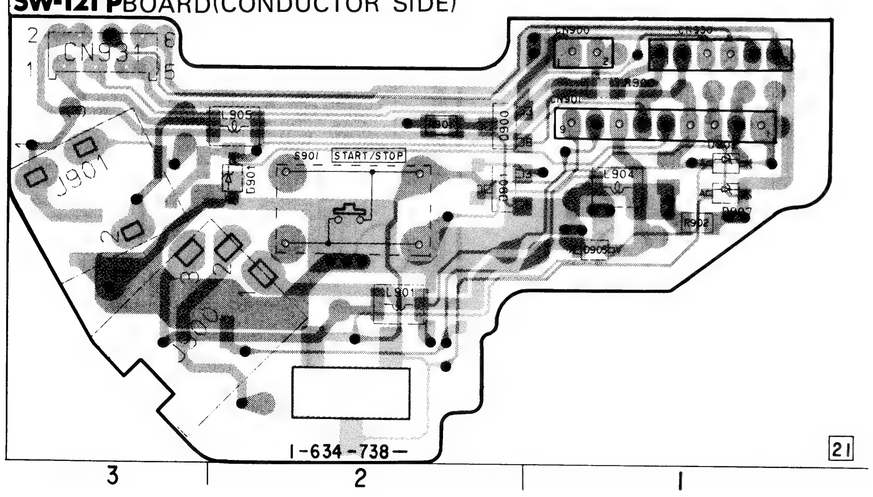
MC-44P BOARD (COMPONENT SIDE)



SW-121P BOARD (COMPONENT SIDE)



SW-121P BOARD (CONDUCTOR SIDE)



DIODE

D900	8-719-977-34	DIODE DTZ12
D901	8-719-977-34	DIODE DTZ12
D902	8-719-404-46	DIODE MA110
D903	8-719-977-34	DIODE DTZ12
D904	8-719-977-34	DIODE DTZ12
D905	8-719-404-46	DIODE MA110
D906	8-719-404-46	DIODE MA110
D907	8-719-404-46	DIODE MA110

TRANSISTOR

Q900	8-729-901-01	TRANSISTOR DTC144EK
Q901	8-729-902-XX	TRANSISTOR DTC114TK

DIODE

D652	8-719-106-43	DIODE RD9.1M-B1
D655	8-719-404-46	DIODE MA110

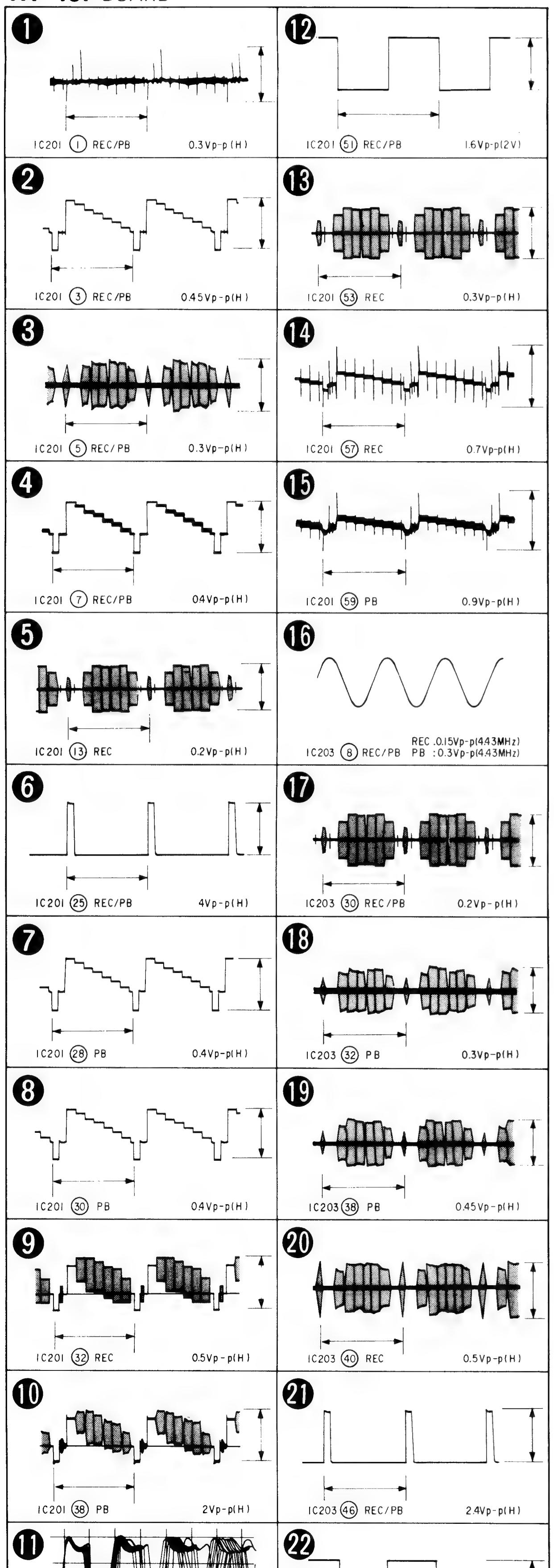
IC

IC650	8-759-822-37	IC LA7293M
IC651	8-759-822-37	IC LA7293M

TRANSISTOR

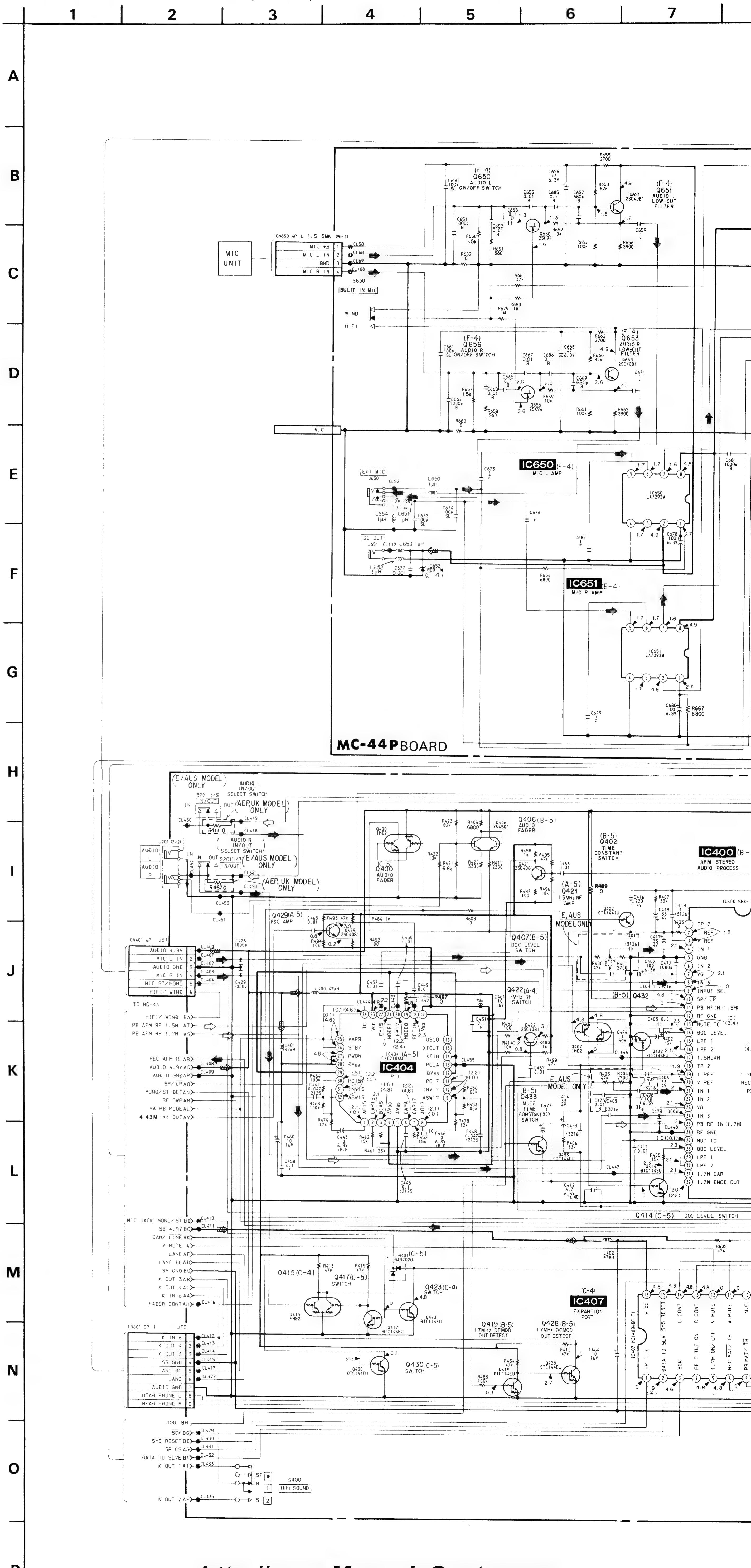
Q650	8-729-109-44	TRANSISTOR 2SK94
Q651	8-729-905-35	TRANSISTOR 2SC4081-R
Q653	8-729-905-35	TRANSISTOR 2SC4081-R
Q654	8-729-905-12	TRANSISTOR DTA144EU
Q655	8-729-905-12	TRANSISTOR DTA144EU
Q656	8-729-109-44	TRANSISTOR 2SK94
Q657	8-729-905-35	TRANSISTOR 2SC4081-R
Q658	8-729-904-07	TRANSISTOR FMG2
Q659	8-729-905-35	TRANSISTOR 2SC4081-R

VA-46P BOARD

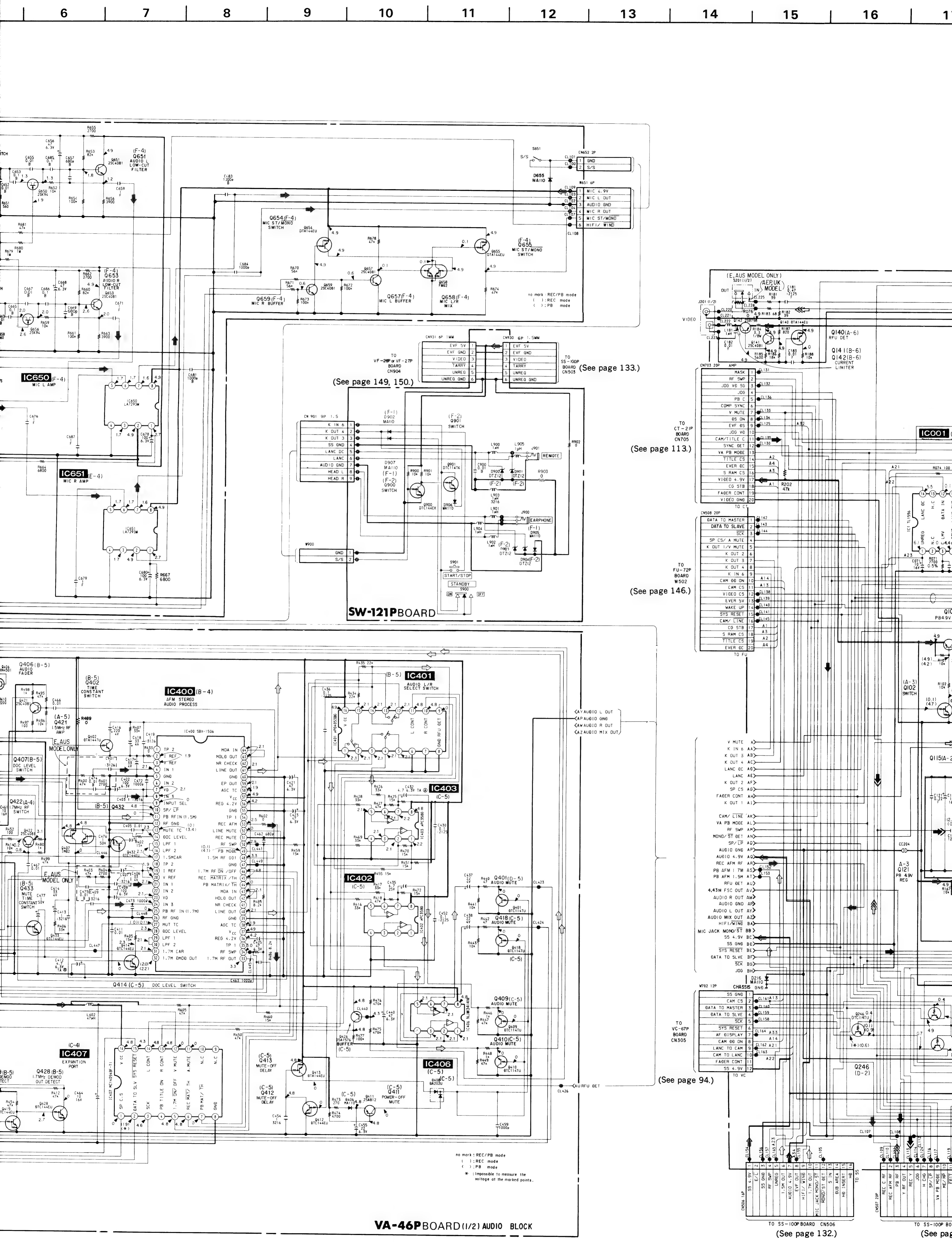


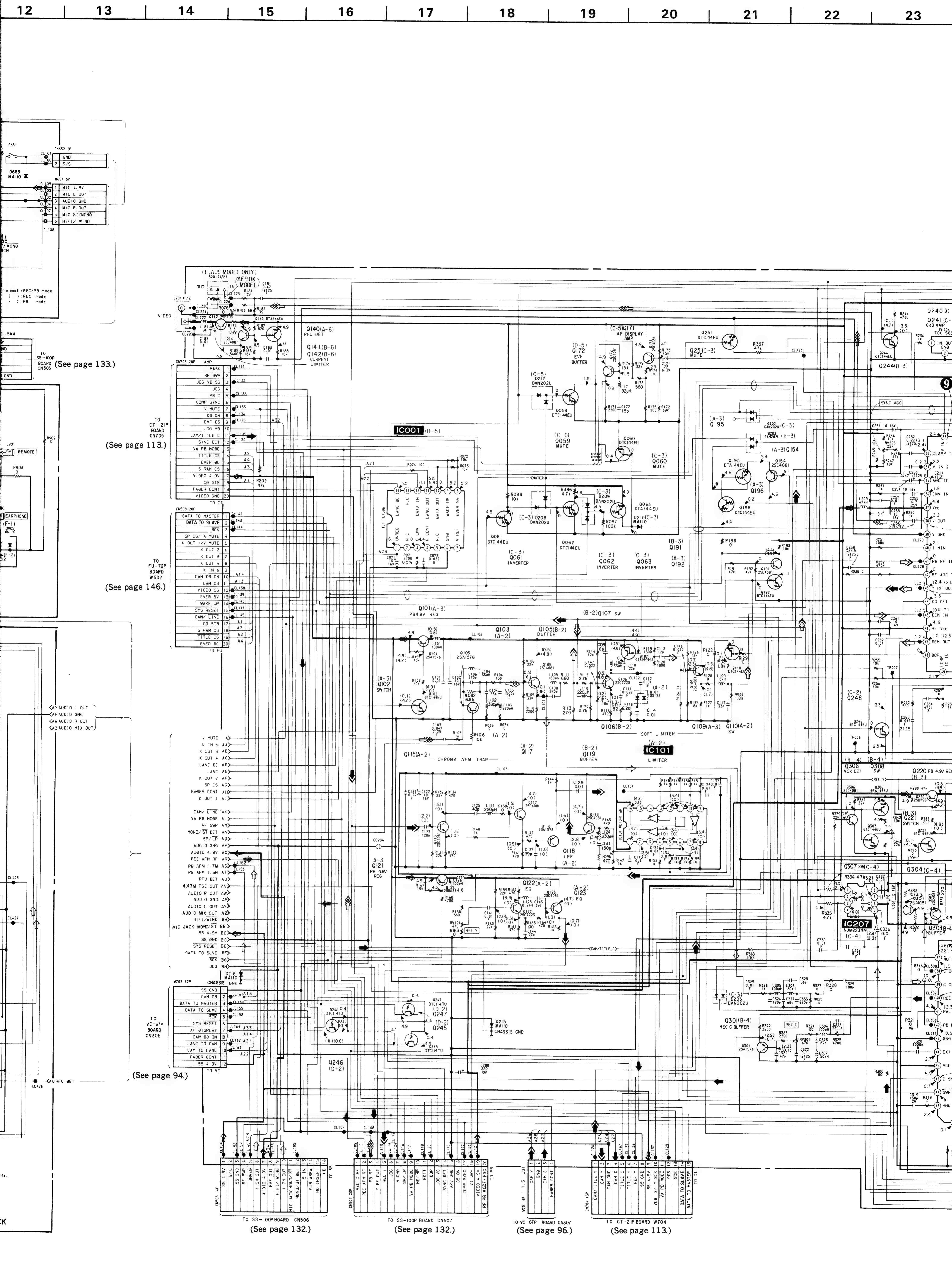
• **Signal path**

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	➡
PB	⇨	⇨⇨	⇨⇨⇨	⇨



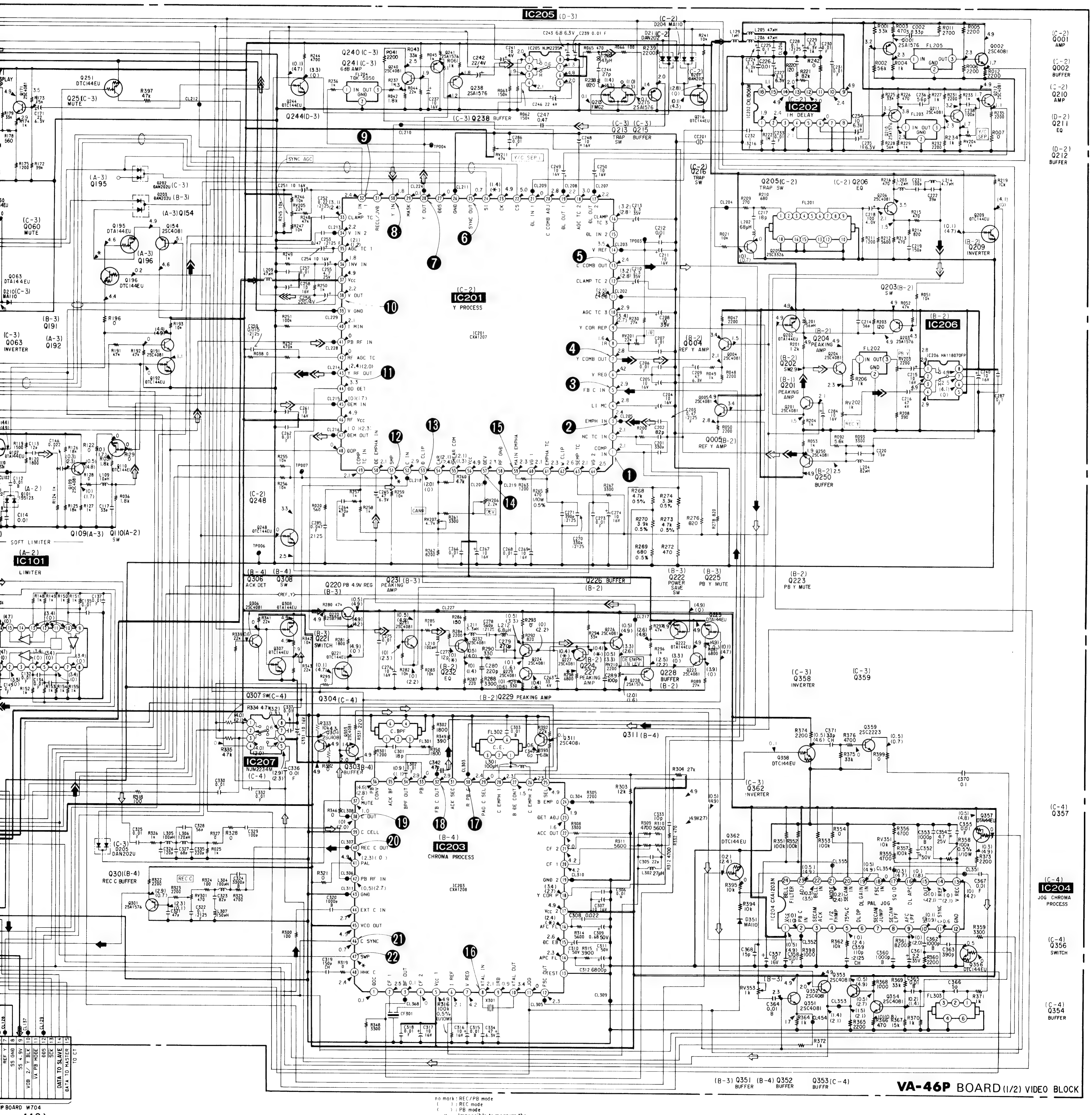
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IC650 MIC L AMP
IC651 MIC R AMP
Q651 AUDIO L LOW-CUT FILTER
Q653 AUDIO R LOW-CUT FILTER
Q654 MIC ST/MONO SWITCH
Q655 MIC ST/MONO SWITCH
Q659 MIC R BUFFER
Q657 MIC L BUFFER
Q658 MIC L/R MIX
no mark : REC/PB mode
( ) : REC mode
< > : PB mode
TO VF-20P or VF-27P BOARD CN904
(See page 149, 150.)
TO SS-100P BOARD CN503 (See page 133.)
SW-121P BOARD
REMOTE
EARPHONE
START/STOP
STANDBY
IC400 AFM STEREO AUDIO PROCESS
IC401 AUDIO L/R SELECT SWITCH
IC402
IC403
IC406
IC407 EXPANTION PORT
Q414 DOC LEVEL SWITCH
Q401 AUDIO MUTE
Q418 AUDIO MUTE
Q409 AUDIO MUTE
Q410 AUDIO MUTE
Q411 POWER-OFF MUTE
Q412 MUTE-OFF DELAY
Q413 MUTE-OFF DELAY
E, AUS MODEL ONLY
no mark : REC/PB mode
( ) : REC mode
< > : PB mode
* : Impossible to measure the voltage at the marked points.
VA-46P BOARD (1/2) AUDIO BLOCK
TO CT-21P BOARD CN705
(See page 113.)
TO FU-72P BOARD W502
(See page 146.)
TO VC-67P BOARD CN305
(See page 94.)
Q140 RFU DET
Q141, Q142 CURRENT LIMITER
IC001
TO SS-100P BOARD CN506
(See page 132.)



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20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31



VA-46P BOARD (1/2) VIDEO BLOCK

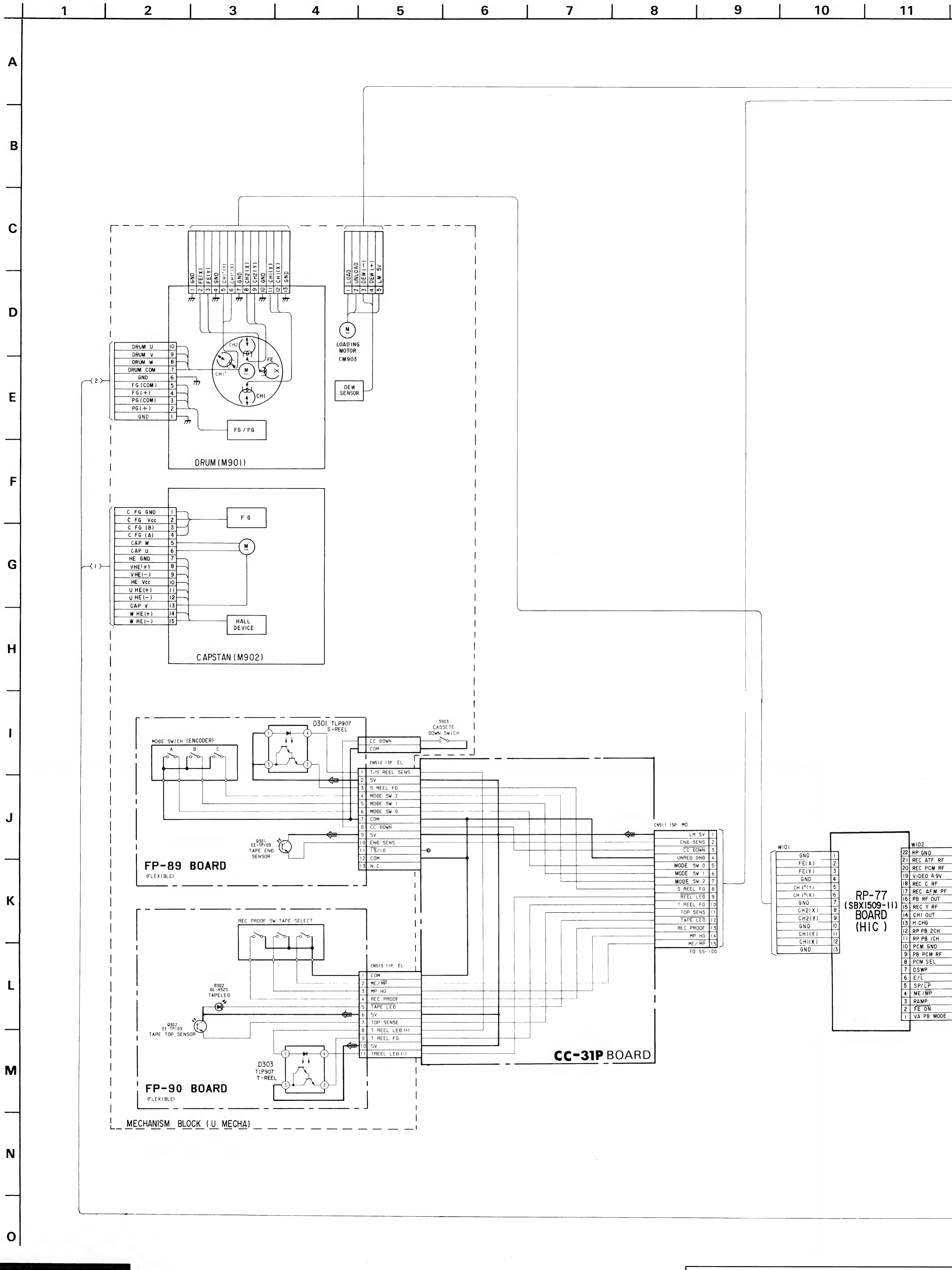
no mark : REC/PB mode
( ) : REC mode
( ) : PB mode
* : impossible to measure the voltage at the marked points.

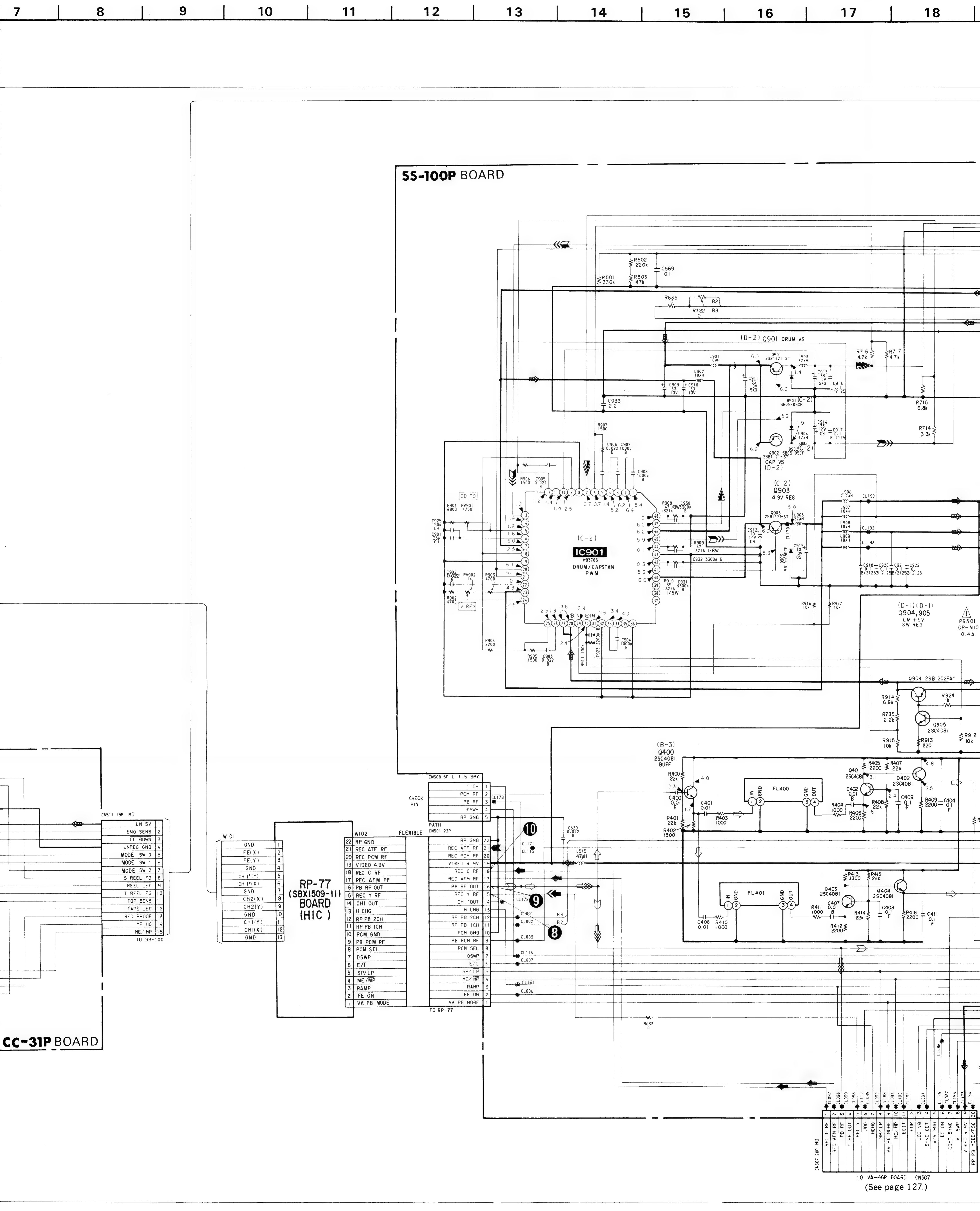
page 113.)

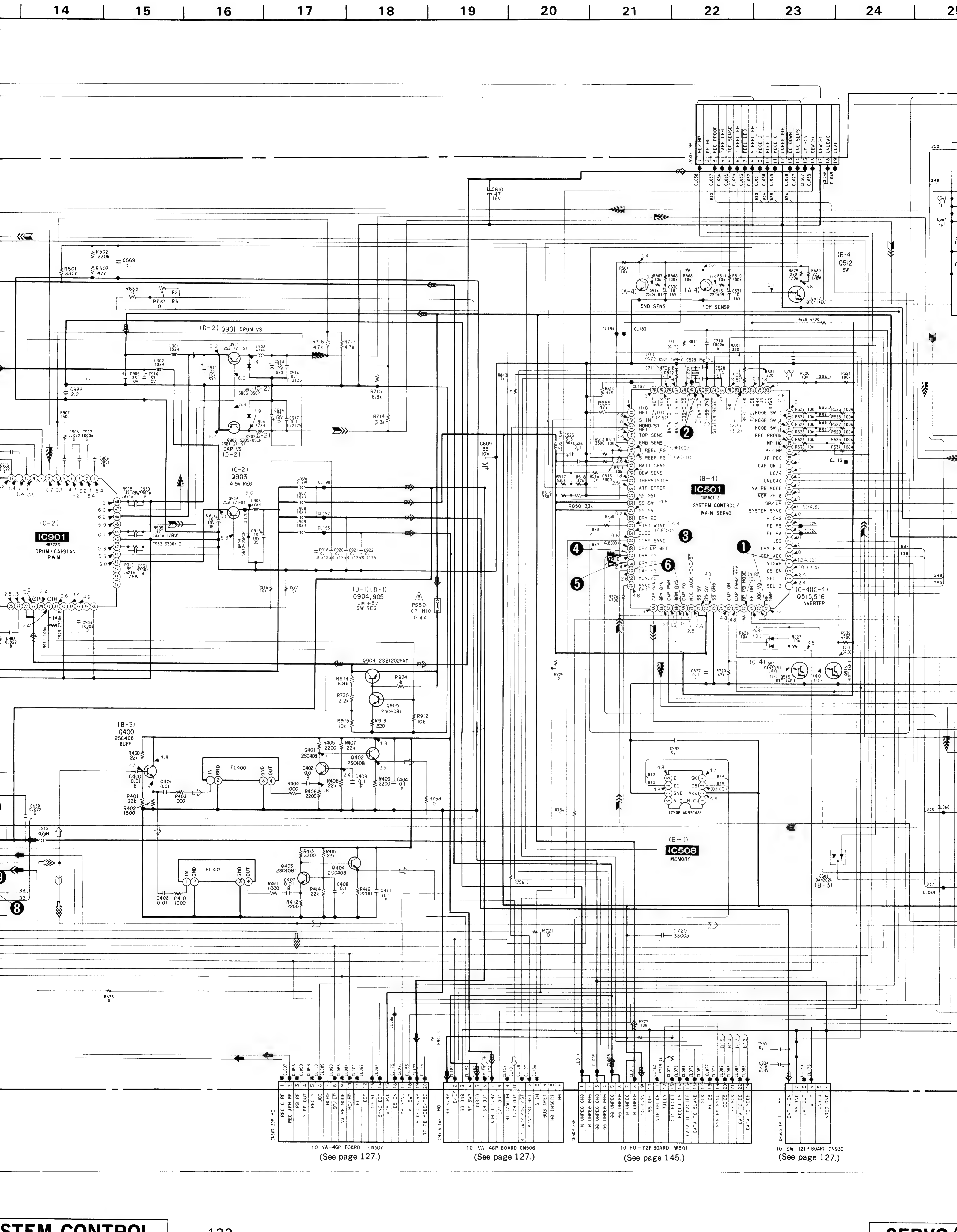
CCD-F550E

CC-31P (Relay), SS-100P (SERVO/SYSTEM CONTROL), FP-89, FP-90 (MECHADECK FLEXIBLE) SCHEMATIC DIAGRAM

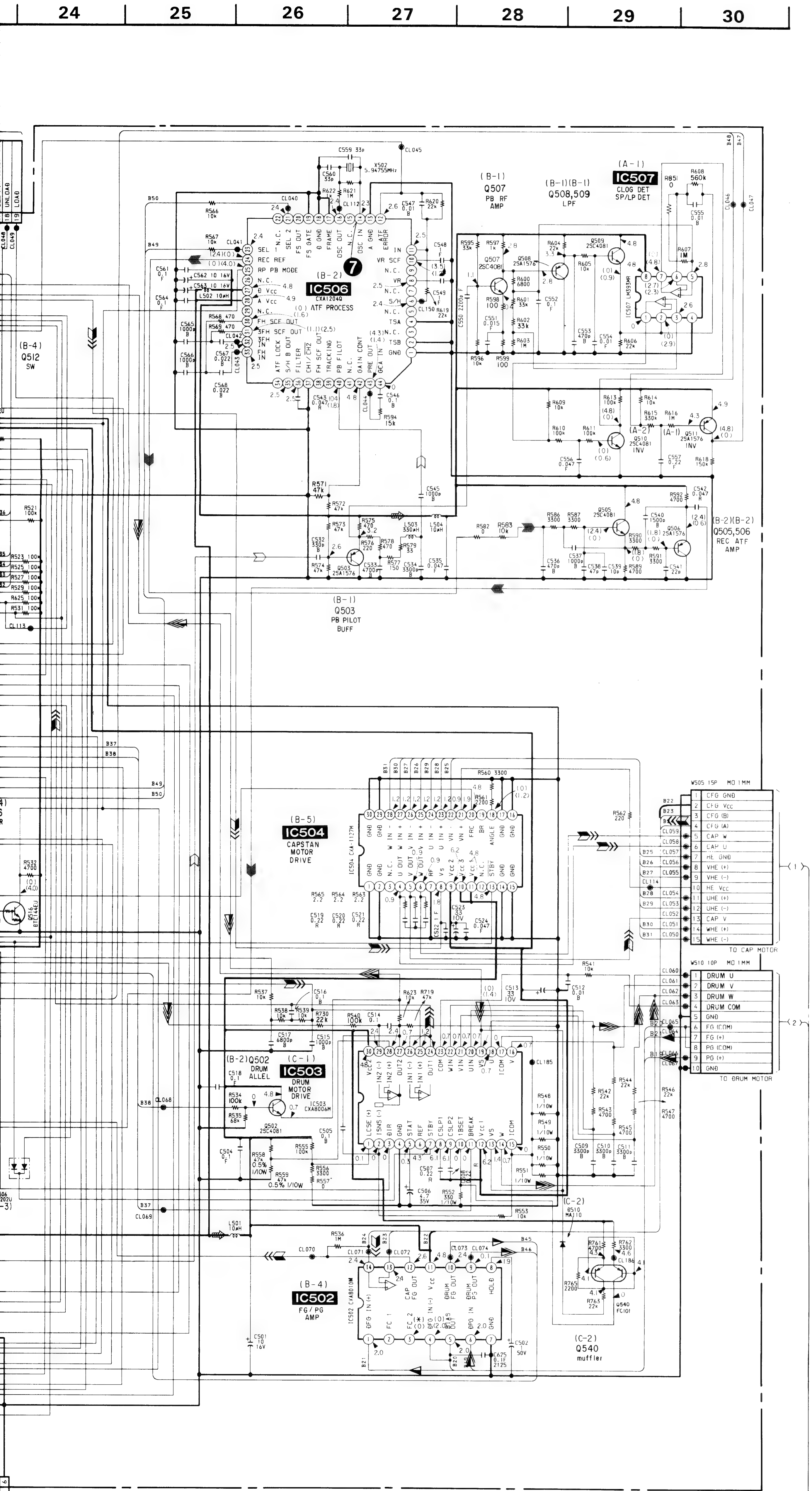
—Ref. No. CC-31P BOARD : 2000 series, SS-100P BOARD : 4000 series—




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SS-100P BOARD
CC-31P BOARD
RP-77 (SBX1509-11) BOARD (HIC)
IC901 DRUM/CAPSTAN PWM
(D-2) Q901 DRUM VS
Q903 4.9V REG
Q904,905 LM +5V SW REG
PS501 ICP-N10 0.4A
Q400 2SC4081 BUFF
FL400
FL401
CN508 5P L 1.5 SMK
CN501 22P
CN511 15P MD
CN507 20P MC
CHECK PIN
FLEXIBLE
TO RP-77
TO SS-100
TO VA-46P BOARD CN507
(See page 127.)



14 15 16 17 18 19 20 21 22 23 24
(C-2) IC901 MB3783 DRUM/CAPSTAN PWM
(D-2) Q901 DRUM VS
Q902 2SB1121-ST CAP VS (D-2)
(C-2) Q903 4.9V REG
(D-1)(D-1) Q904,905 LM +5V SW REG
PS501 ICP-N10 0.4A
Q904 2SB1202FAT
(B-3) Q400 2SC4081 BUFF
FL400
FL401
(B-4) IC501 CXP80116 SYSTEM CONTROL/ MAIN SERVO
(B-1) IC508 MEMORY
IC508 AK93C46F
(A-4) END SENS
(A-4) TOP SENSE
(B-4) Q512 SW
(C-4)(C-4) Q515,516 INVERTER
CN502 19P
TO VA-46P BOARD CN507 (See page 127.)
TO VA-46P BOARD CN506 (See page 127.)
TO FU-72P BOARD W501 (See page 145.)
TO SW-121P BOARD CN930 (See page 127.)



no mark REC/PB mode
( ) REC mode
< > PB mode
※ Impossible to measure the voltage at the marked points.

• **Signal path**

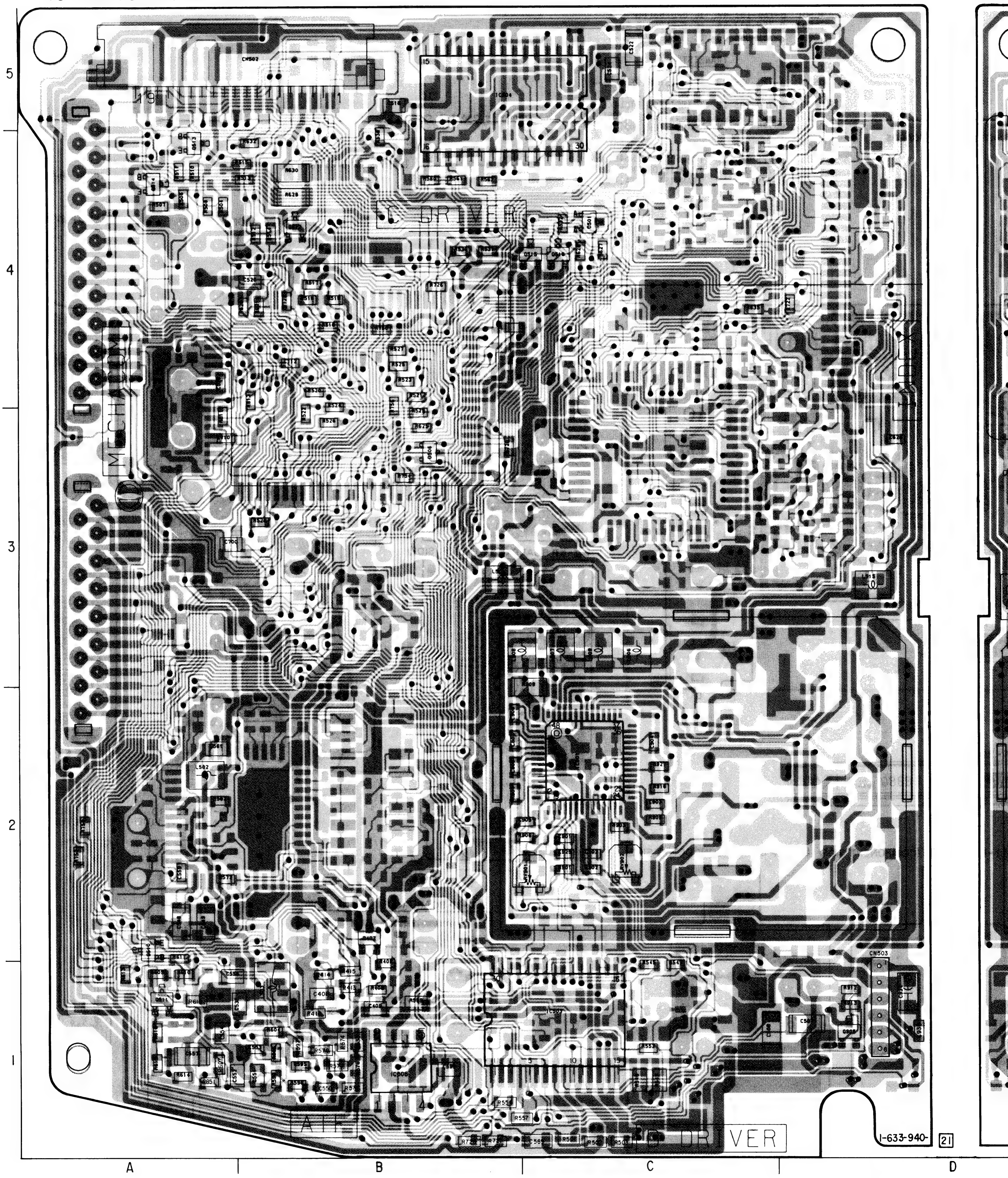
	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡›	➡››	➡
PB	⇨	⇨›	⇨››	⇨

• **Signal path**

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶▶	
Drum servo(speed and phase)		▶▶▶	
Capstan speed servo		➤	
Capstan phase servo	➤›	➤›	▷›
Capstan servo(speed and phase)		➤››	
Ref.signal	➤	➤	▷

CC-31P (Relay), SS-100P (SERVO/SYSTEM CONTROL), FP-89, FP-90 (MECHADECK FLEXIBLE) PRINTED WIRING BOARDS
—Ref. No. CC-31P BOARD : 2000 series, SS-100P BOARD : 4000 series—

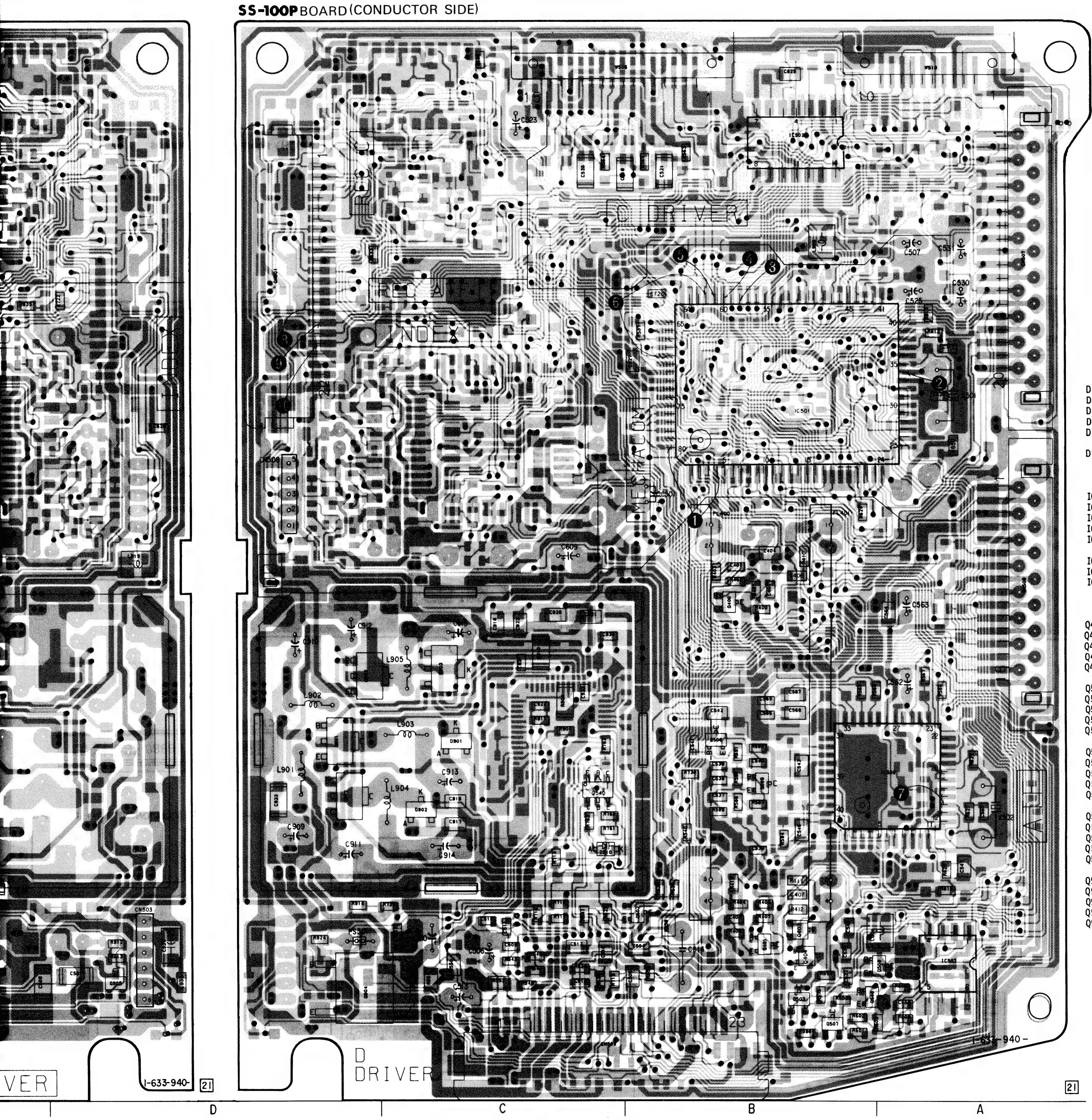
SS-100P BOARD (COMPONENT SIDE)



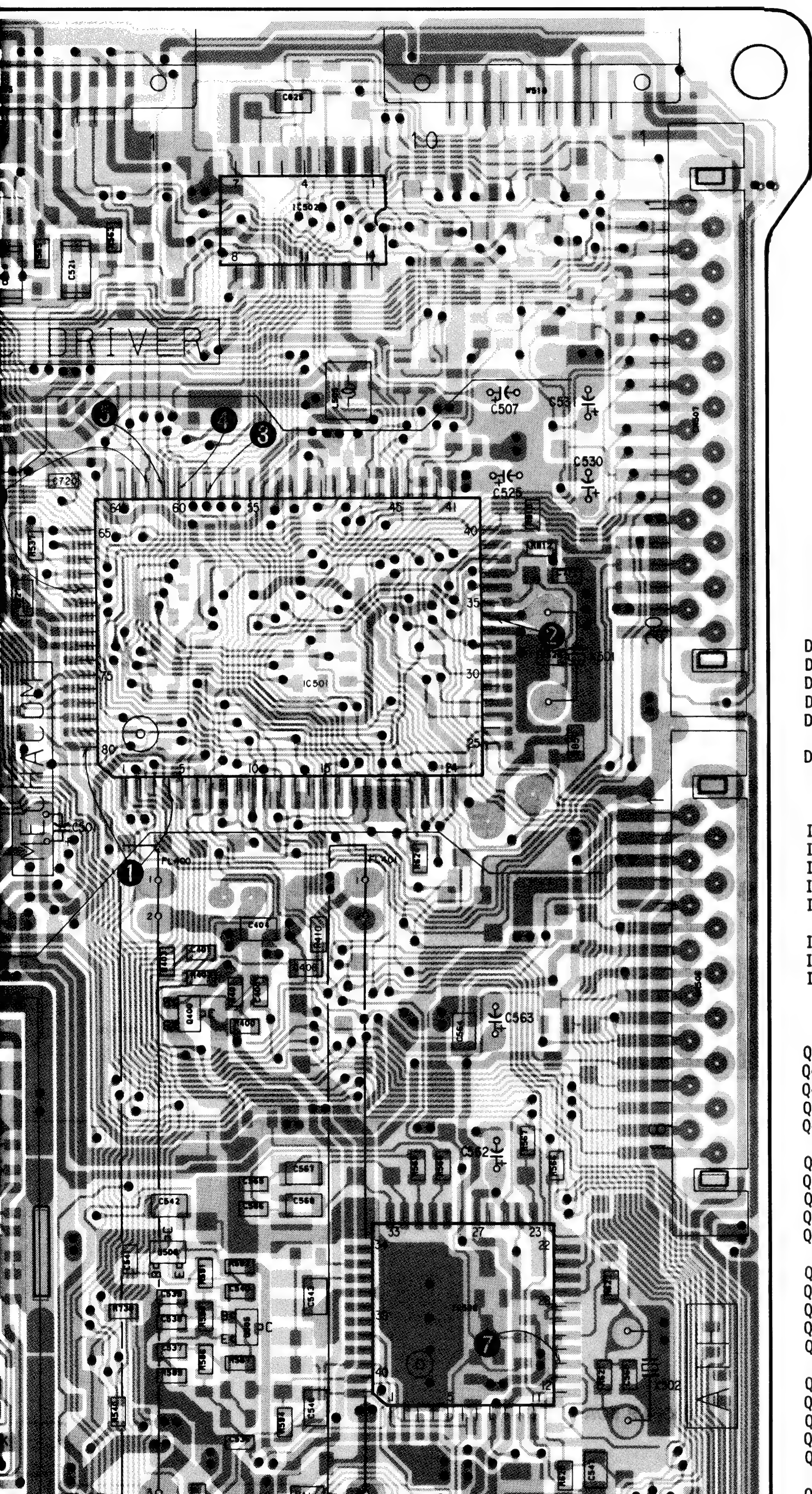
http://www.ManualsCenter.com

DS

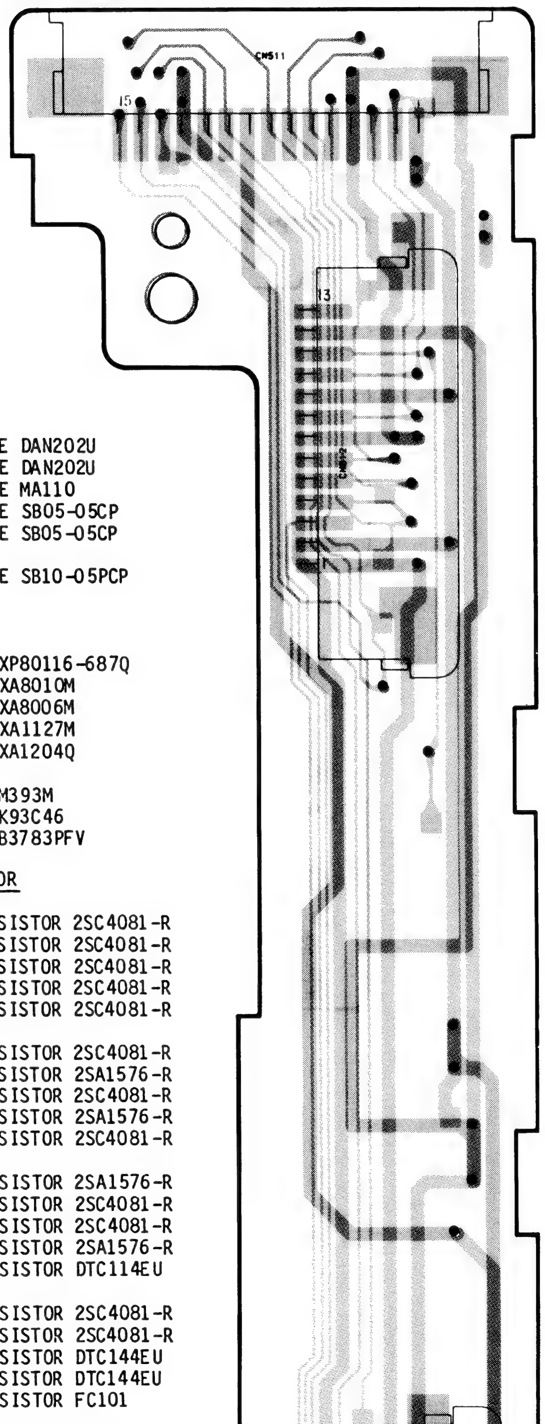
SS-100P BOARD (CONDUCTOR SIDE)



D	C	B	A

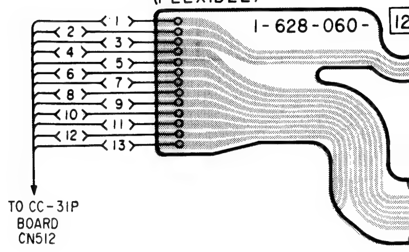


CC-31P BOARD (COMPONENT SIDE)

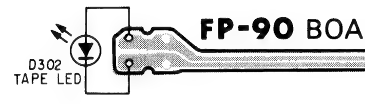


FP-89 BOARD

(FLEXIBLE)



FP-90 BOARD



TO CC-
BOAR
CN51

<u>DIODE</u>

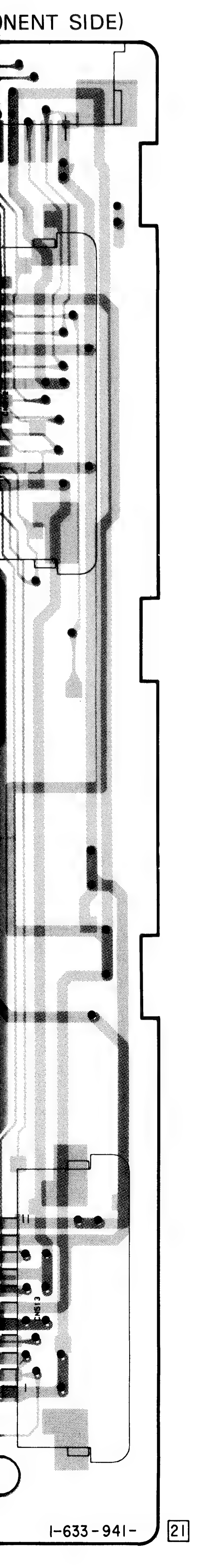
D501	8-719-941-86	DIODE DAN202U
D506	8-719-941-86	DIODE DAN202U
D510	8-719-404-46	DIODE MA110
D901	8-719-938-75	DIODE SB05-05CP
D902	8-719-938-75	DIODE SB05-05CP
D903	8-719-938-78	DIODE SB10-05PCP

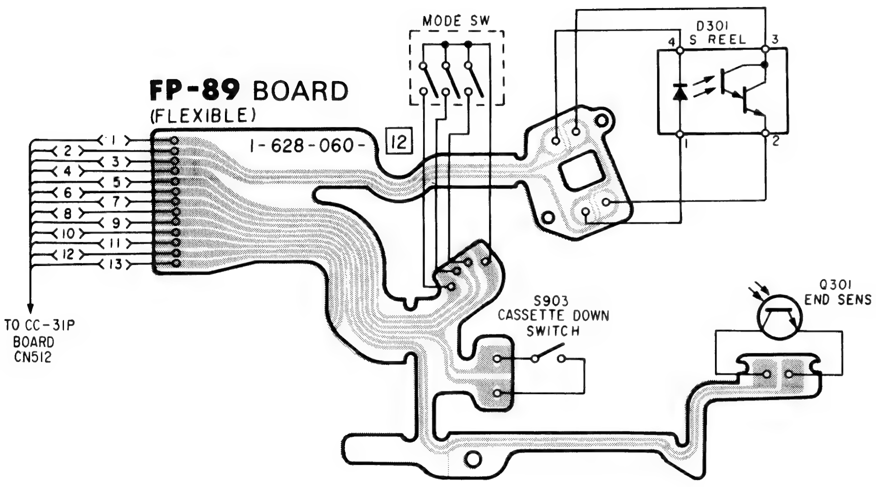
<u>IC</u>

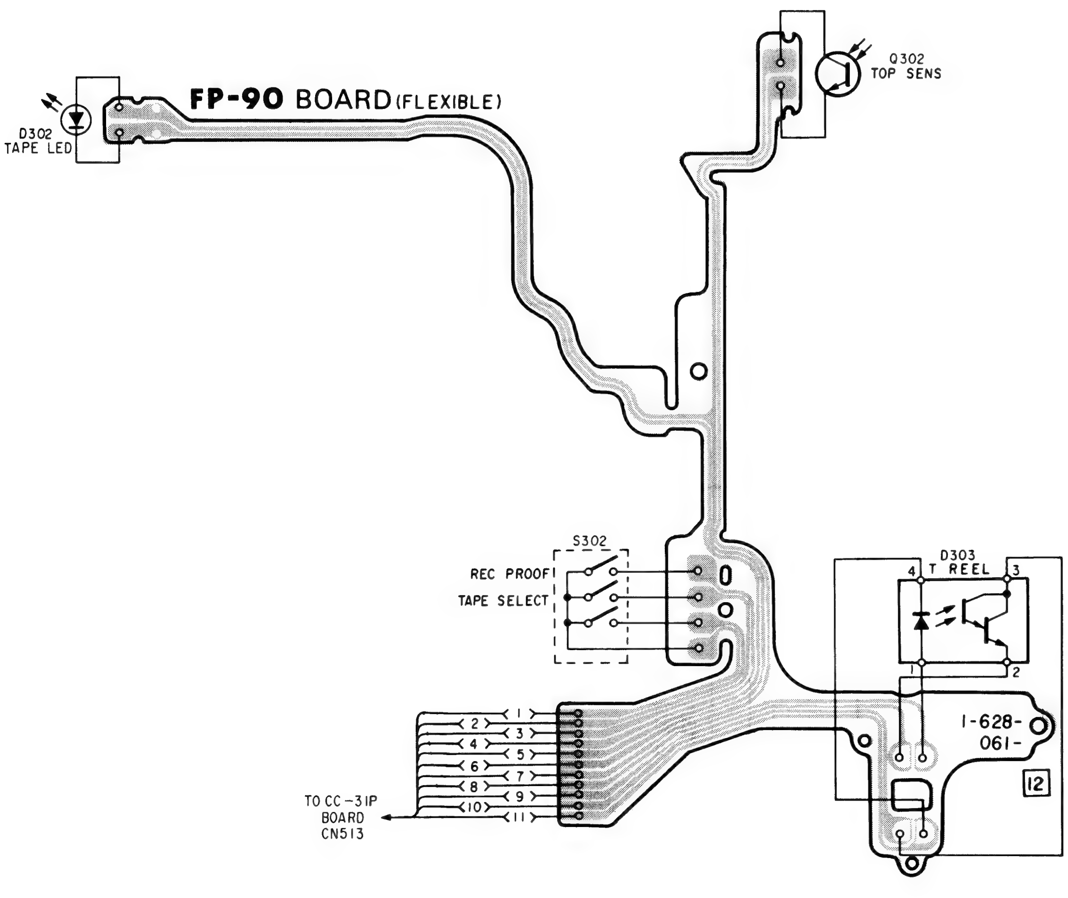
IC501	8-752-815-77	IC CXP80116-687Q
IC502	8-759-148-05	IC CXA8010M
IC503	8-759-990-55	IC CXA8006M
IC504	8-759-805-06	IC CXA1127M
IC506	8-752-209-53	IC CXA1204Q
IC507	8-759-030-03	IC LM393M
IC508	8-759-979-38	IC AK93C46
IC901	8-759-500-42	IC MB3783PFV

<u>TRANSISTOR</u>

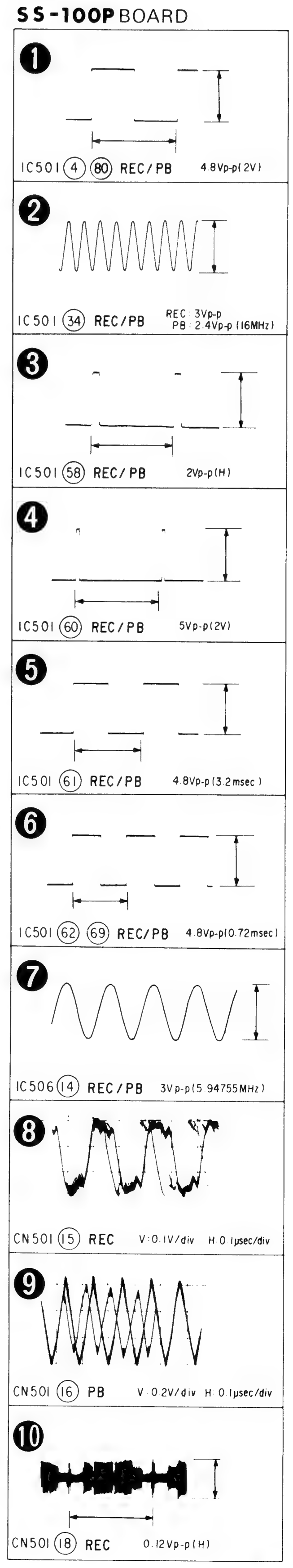
Q400	8-729-905-35	TRANSISTOR 2SC4081-R
Q401	8-729-905-35	TRANSISTOR 2SC4081-R
Q402	8-729-905-35	TRANSISTOR 2SC4081-R
Q403	8-729-905-35	TRANSISTOR 2SC4081-R
Q404	8-729-905-35	TRANSISTOR 2SC4081-R
Q502	8-729-905-35	TRANSISTOR 2SC4081-R
Q503	8-729-905-23	TRANSISTOR 2SA1576-R
Q505	8-729-905-35	TRANSISTOR 2SC4081-R
Q506	8-729-905-23	TRANSISTOR 2SA1576-R
Q507	8-729-905-35	TRANSISTOR 2SC4081-R
Q508	8-729-905-23	TRANSISTOR 2SA1576-R
Q509	8-729-905-35	TRANSISTOR 2SC4081-R
Q510	8-729-905-35	TRANSISTOR 2SC4081-R
Q511	8-729-905-23	TRANSISTOR 2SA1576-R
Q512	8-729-907-00	TRANSISTOR DTC114EU
Q513	8-729-905-35	TRANSISTOR 2SC4081-R
Q514	8-729-905-35	TRANSISTOR 2SC4081-R
Q515	8-729-905-18	TRANSISTOR DTC144EU
Q516	8-729-905-18	TRANSISTOR DTC144EU
Q540	8-729-822-48	TRANSISTOR FC101
Q901	8-729-805-25	TRANSISTOR 2SB1121
Q902	8-729-805-25	TRANSISTOR 2SB1121
Q903	8-729-805-25	TRANSISTOR 2SB1121
Q904	8-729-820-46	TRANSISTOR 2SB1202FAT
Q905	8-729-905-35	TRANSISTOR 2SC4081-R





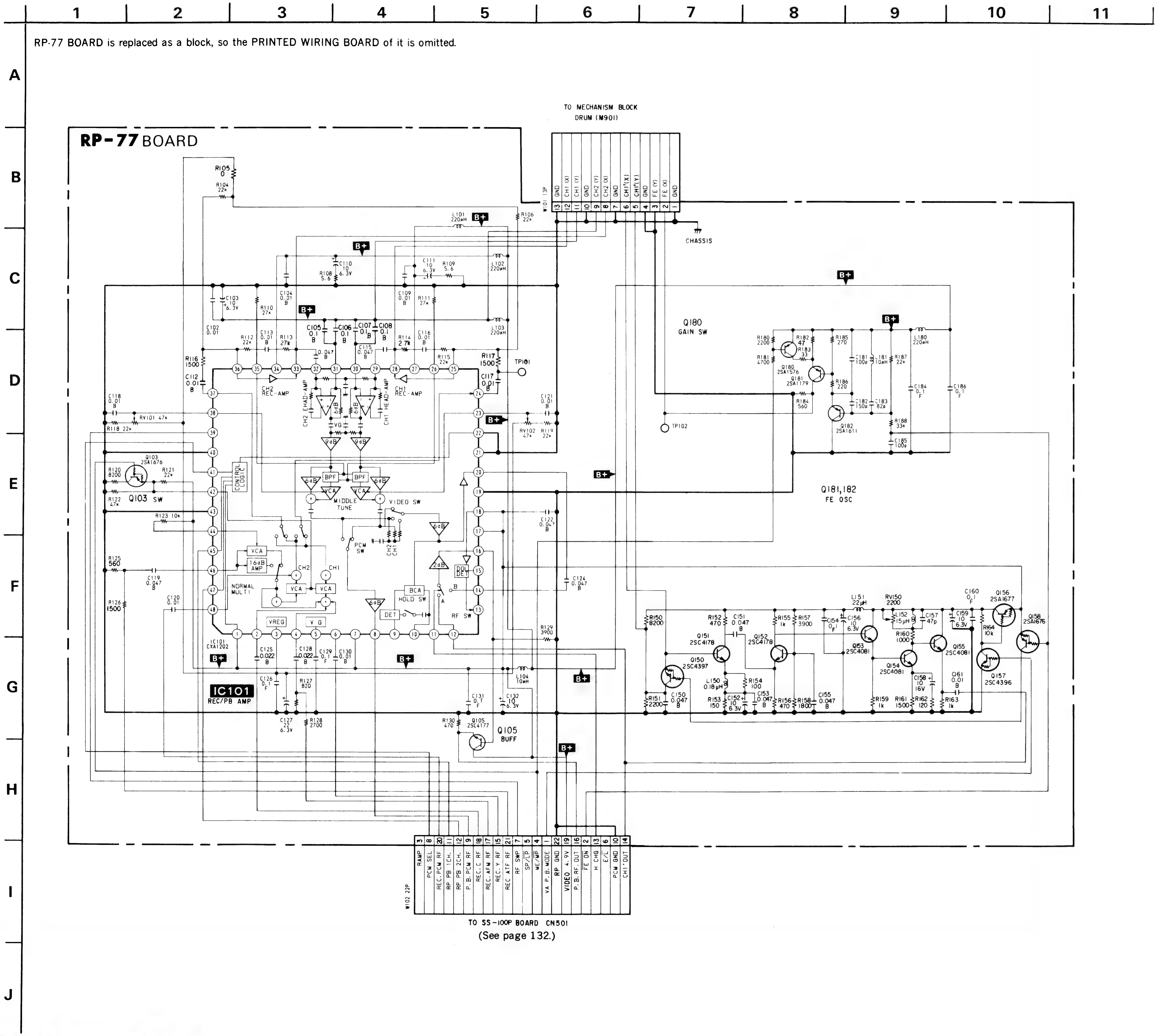


SS-100P BOARD



RP-77 (HEAD AMP) SCHEMATIC DIAGRAM

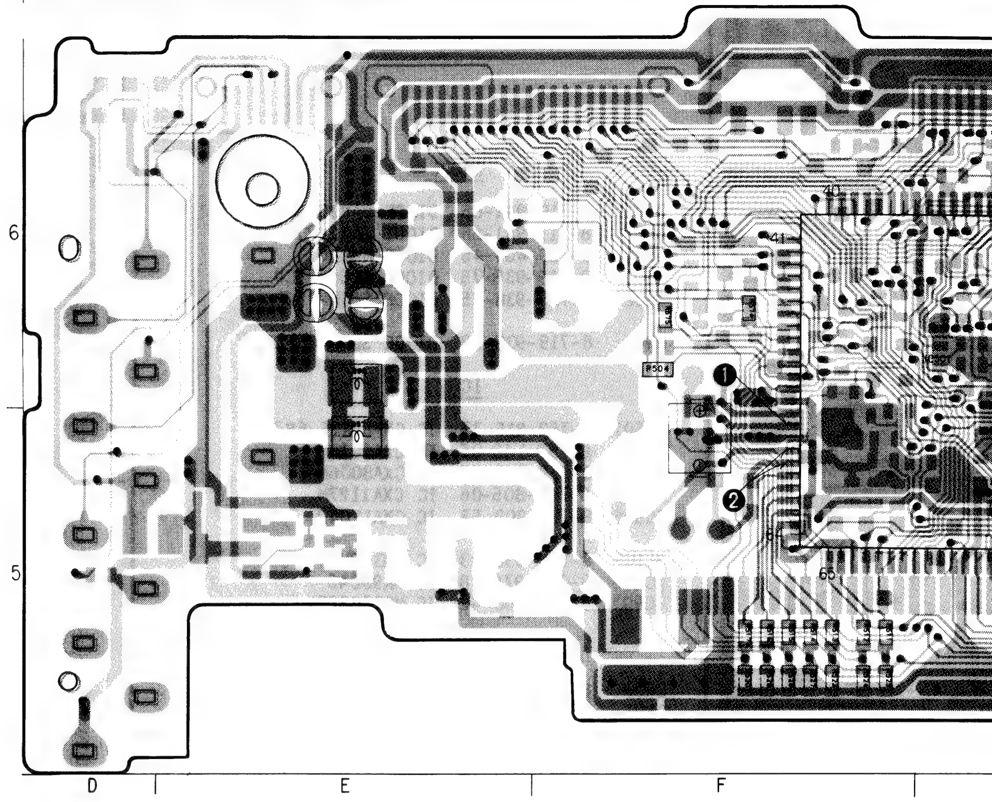
RP-77 BOARD is replaced as a block, so the PRINTED WIRING BOARD of it is omitted.



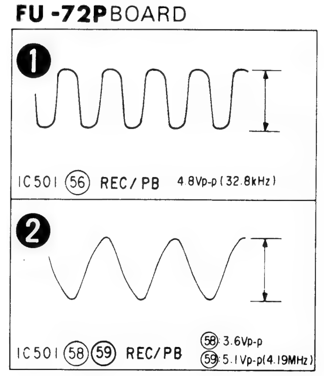
CK-20P, DK-5P, ED-19P (FUNCTION SWITCH), FU-72P (MODE CONTROL), LI-17P

—Ref. No. CK-20P, DK-5P, ED-19P BOARDS: 5000 series, FU-72P BOARD: 6000 series,

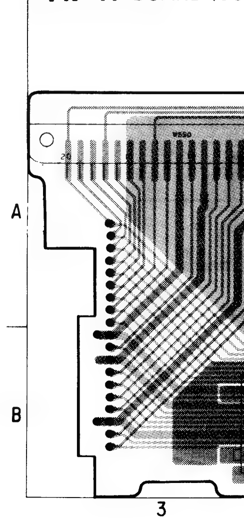
FU-72P BOARD (COMPONENT SIDE)



FU-72P BOARD



VK-4P BOARD (CO



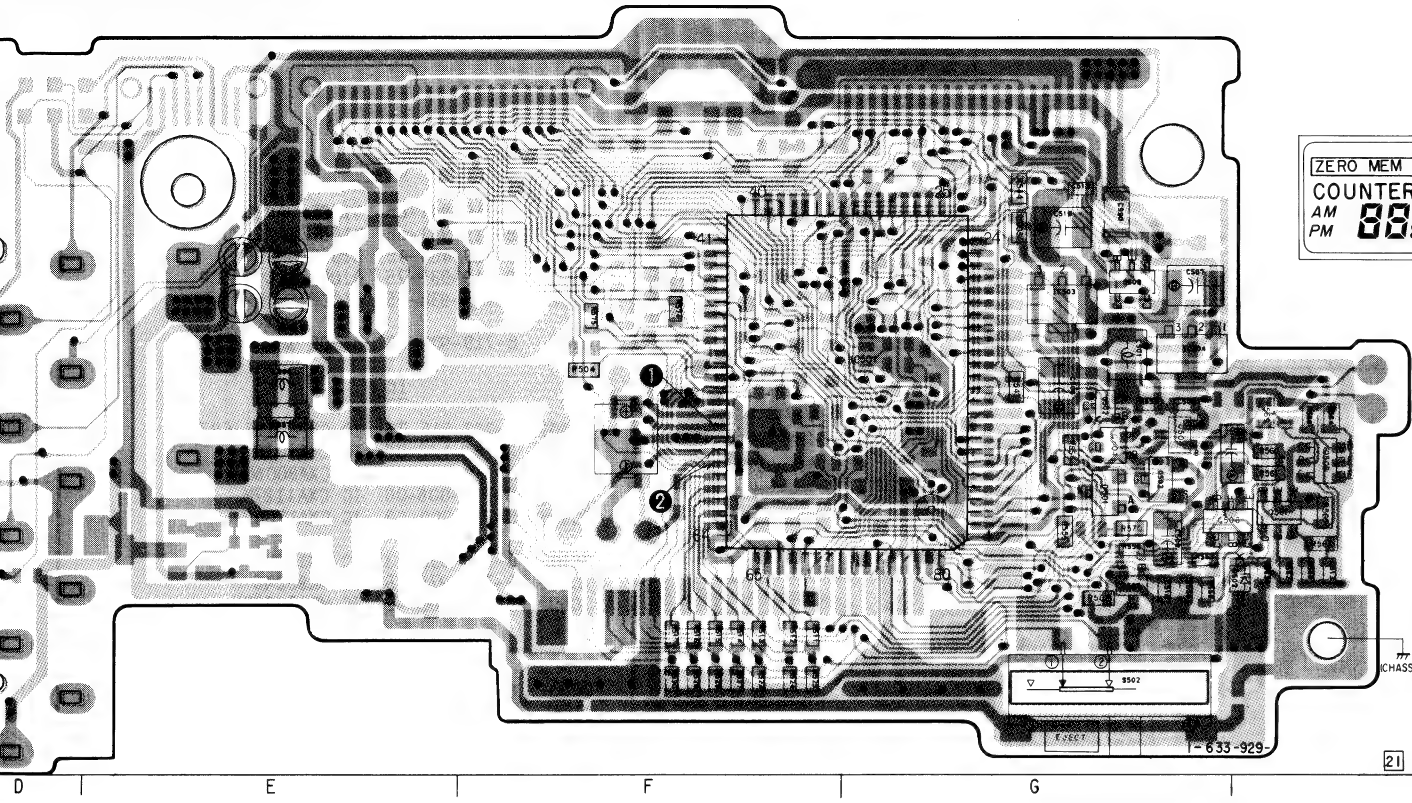
TRANSISTOR

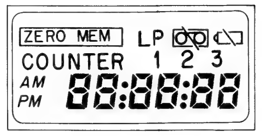
Q502	8-729-905-23	TRANSISTOR 2SA1576-R
Q503	8-729-109-44	TRANSISTOR 2SK94
Q504	8-729-905-18	TRANSISTOR DTC144EU
Q505	8-729-905-35	TRANSISTOR 2SC4081-R
Q506	8-729-402-78	TRANSISTOR XN6401
Q507	8-729-402-19	TRANSISTOR XN6501
Q508	8-729-402-78	TRANSISTOR XN6401
Q509	8-729-904-20	TRANSISTOR FMA2
Q579	8-729-905-12	TRANSISTOR DTA144EU

20P, DK-5P, ED-19P (FUNCTION SWITCH), FU-72P (MODE CONTROL), LI-17P (LITHIUM BATTERY), RM-22P (REMOTE CONTROL RECEIVER), VK-4P (FUNCTION SWITCH), ZK-1P (SWITCH) PRINTED WIRING BOARDS

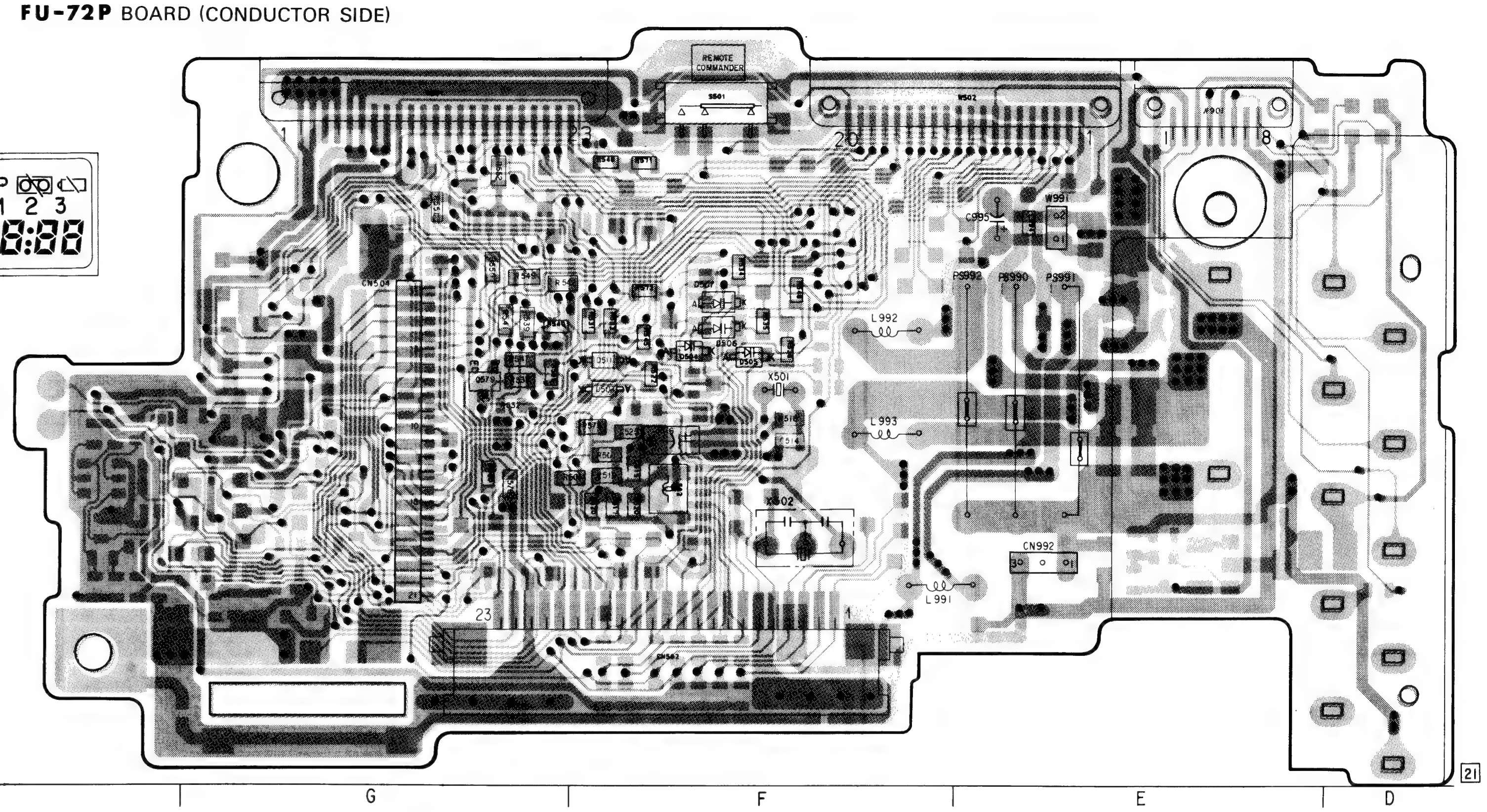
ef. No. CK-20P, DK-5P, ED-19P BOARDS : 5000 series, FU-72P BOARD : 6000 series, LI-17P, RM-22P, VK-4P, ZK-1P BOARDS : 7000 series—

72P BOARD (COMPONENT SIDE)



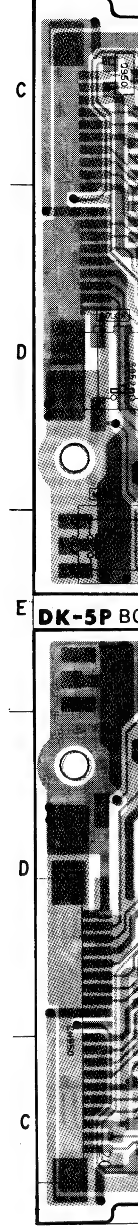


FU-72P BOARD (CONDUCTOR SIDE)

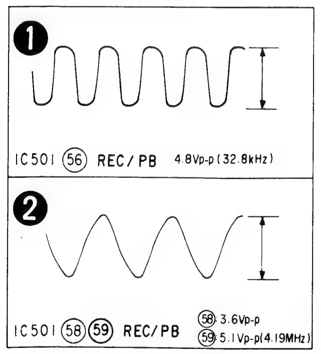


DK-5P BO

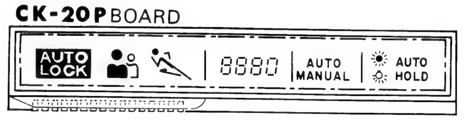
DK-5P BO



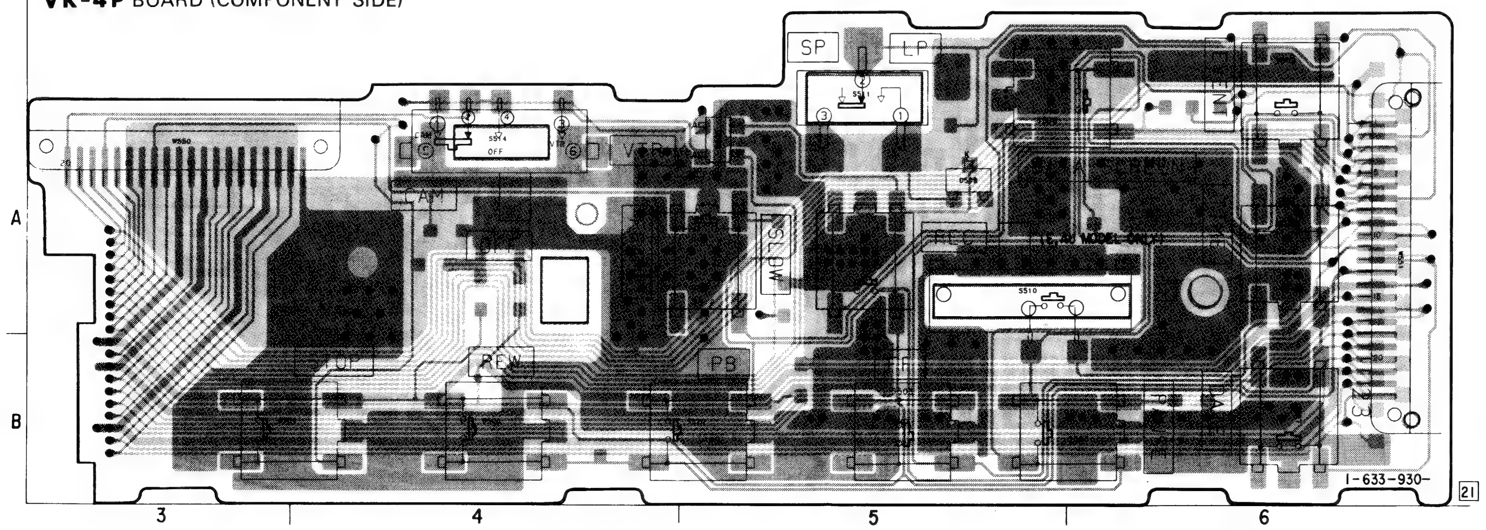
FU-72P BOARD



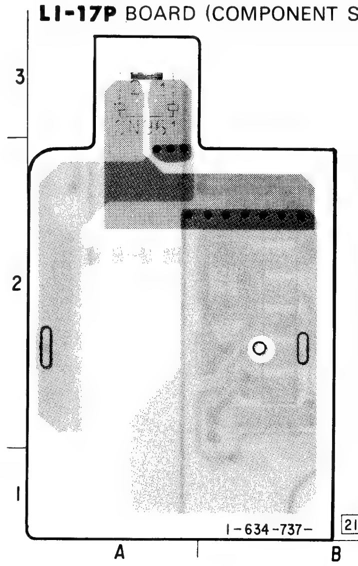
CK-20P BOARD

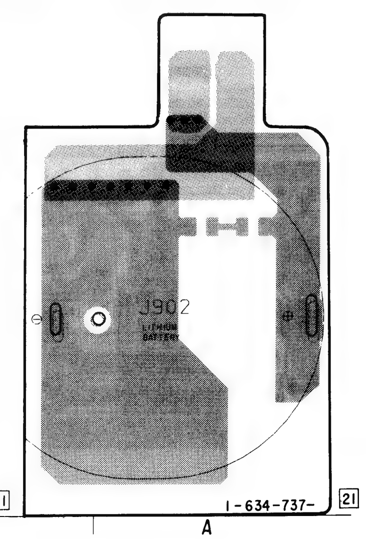


VK-4P BOARD (COMPONENT SIDE)



LI-17P BOARD (COMPONENT SIDE) **LI-17P** BOARD (CONDUCTOR SIDE)





DIODE

D508	8-719-420-34	DIODE MA151K
D509	8-719-940-45	DIODE MA159

DIODE

D501	8-719-938-75	DIODE SB05-05CP-TA
D502	8-719-404-46	DIODE MA110
D503	8-719-404-46	DIODE MA110
D504	8-719-404-46	DIODE MA110
D505	8-719-404-46	DIODE MA110
D506	8-719-404-46	DIODE MA110
D507	8-719-404-46	DIODE MA110
D510	8-719-812-41	DIODE GL3PR8
D511	8-719-404-46	DIODE MA110

IC

IC501	8-759-151-42	IC UPD75316GF-071
IC503	8-759-937-54	IC S-81250HG-RD-S
IC504	8-759-946-03	IC S-8054ALR-LN-S

TRANSISTOR

Q502	8-729-905-23	TRANSISTOR 2SA1576-R
Q503	8-729-109-44	TRANSISTOR 2SK94
Q504	8-729-905-18	TRANSISTOR DTC144EU
Q505	8-729-905-35	TRANSISTOR 2SC4081-R
Q506	8-729-402-78	TRANSISTOR XN6401
Q507	8-729-402-19	TRANSISTOR XN6501
Q508	8-729-402-78	TRANSISTOR XN6401
Q509	8-729-904-20	TRANSISTOR FMA2
Q579	8-729-905-12	TRANSISTOR DTA144EU

IC

IC950	8-759-145-63	IC UPD7564G-540

TRANSISTOR

Q950	8-729-901-01	TRANSISTOR DTC144EK

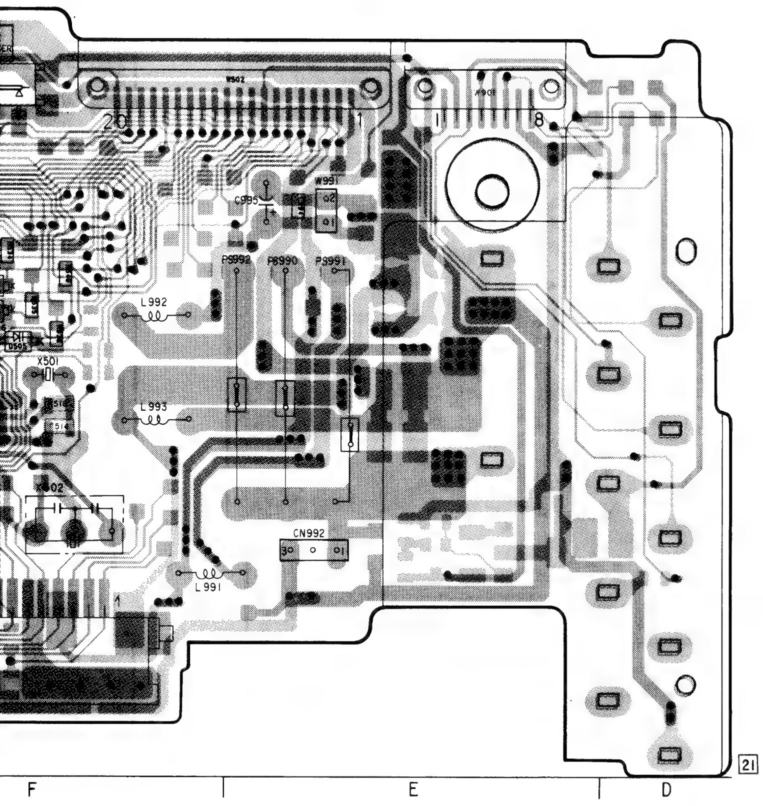
DIODE

D671	8-719-404-46	DIODE MA110
D672	8-719-404-46	DIODE MA110

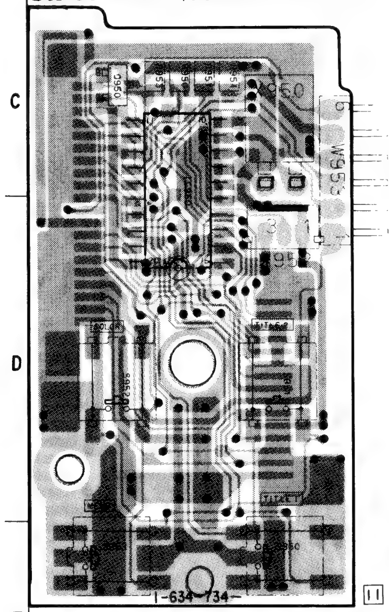
IC

IC670	8-759-634-72	IC M34206M2

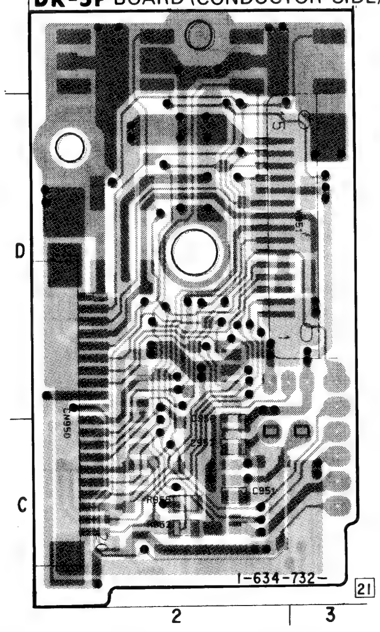
TCH) PRINTED WIRING BOARDS



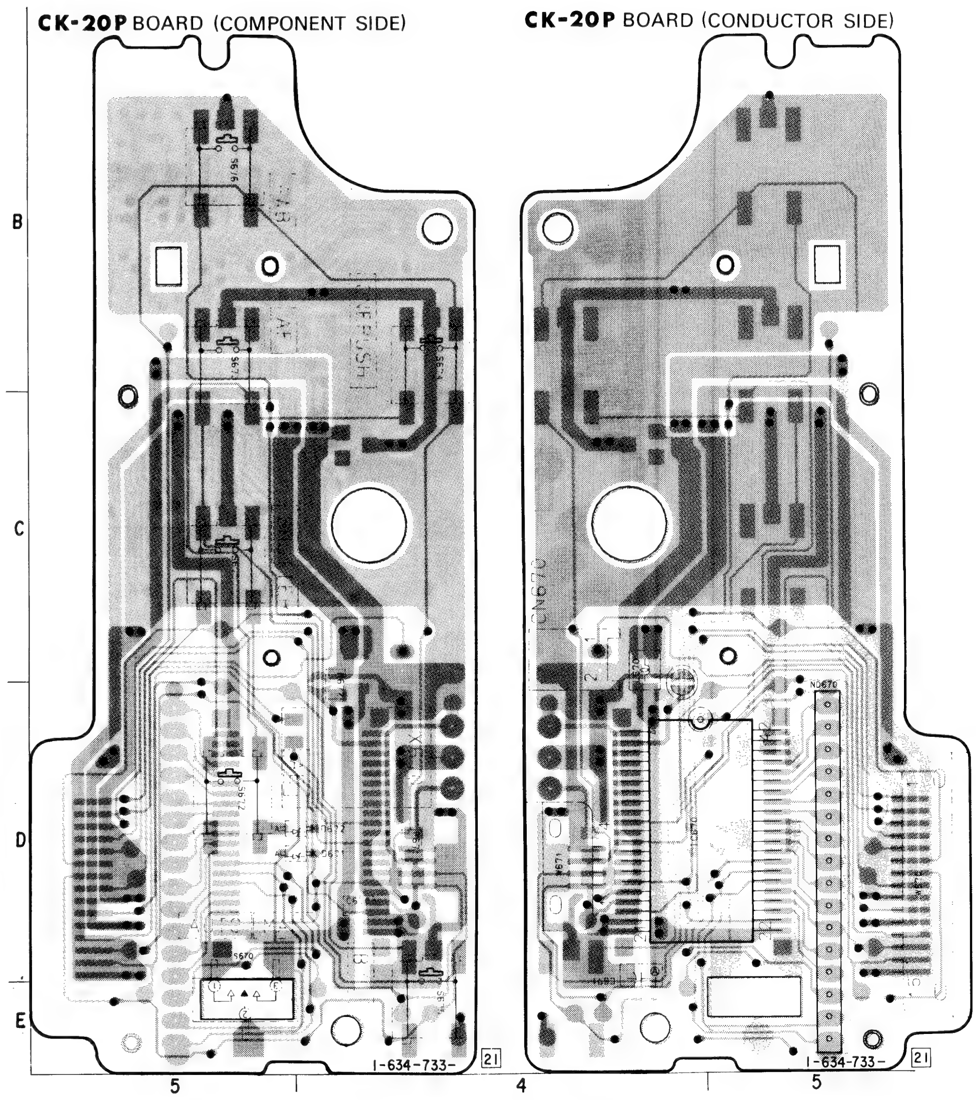
DK-5P BOARD (COMPONENT SIDE)



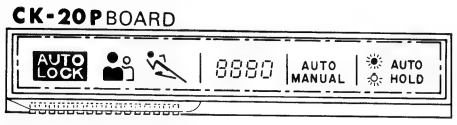
DK-5P BOARD (CONDUCTOR SIDE)



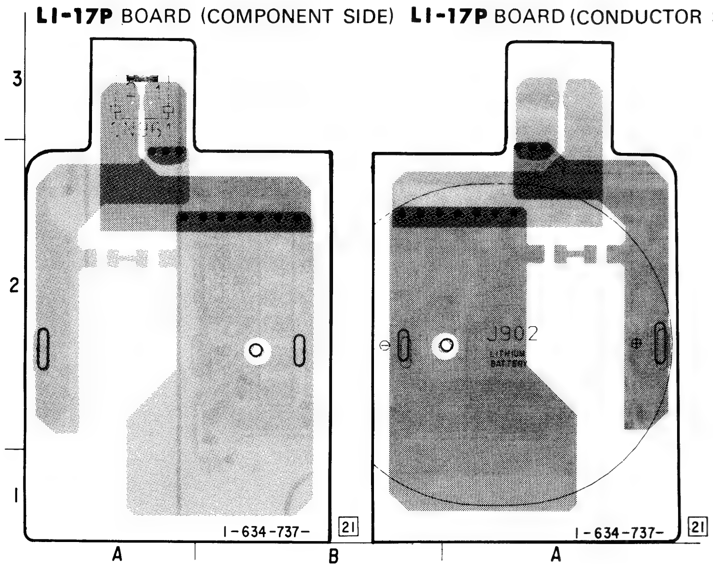
CK-20P BOARD (COMPONENT SIDE) **CK-20P** BOARD (CONDUCTOR SIDE)



CK-20P BOARD

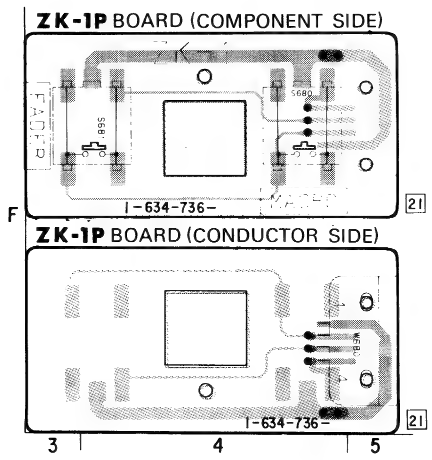


LI-17P BOARD (COMPONENT SIDE) **LI-17P** BOARD (CONDUCTOR SIDE)

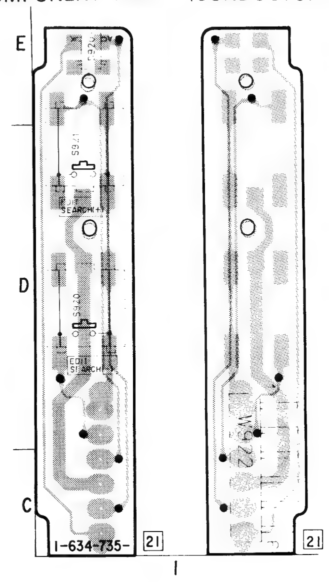


ZK-1P BOARD (COMPONENT SIDE)

ZK-1P BOARD (CONDUCTOR SIDE)

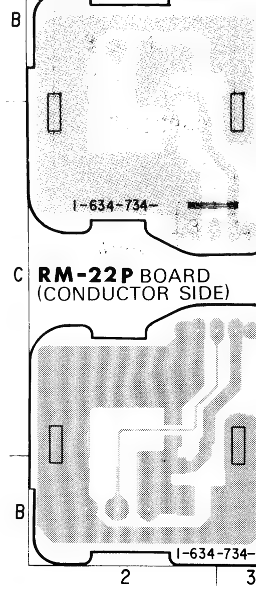


ED-19P BOARD (COMPONENT SIDE) **ED-19P** BOARD (CONDUCTOR SIDE)



RM-22P BOARD (COMPONENT SIDE)

RM-22P BOARD (CONDUCTOR SIDE)



DIODE

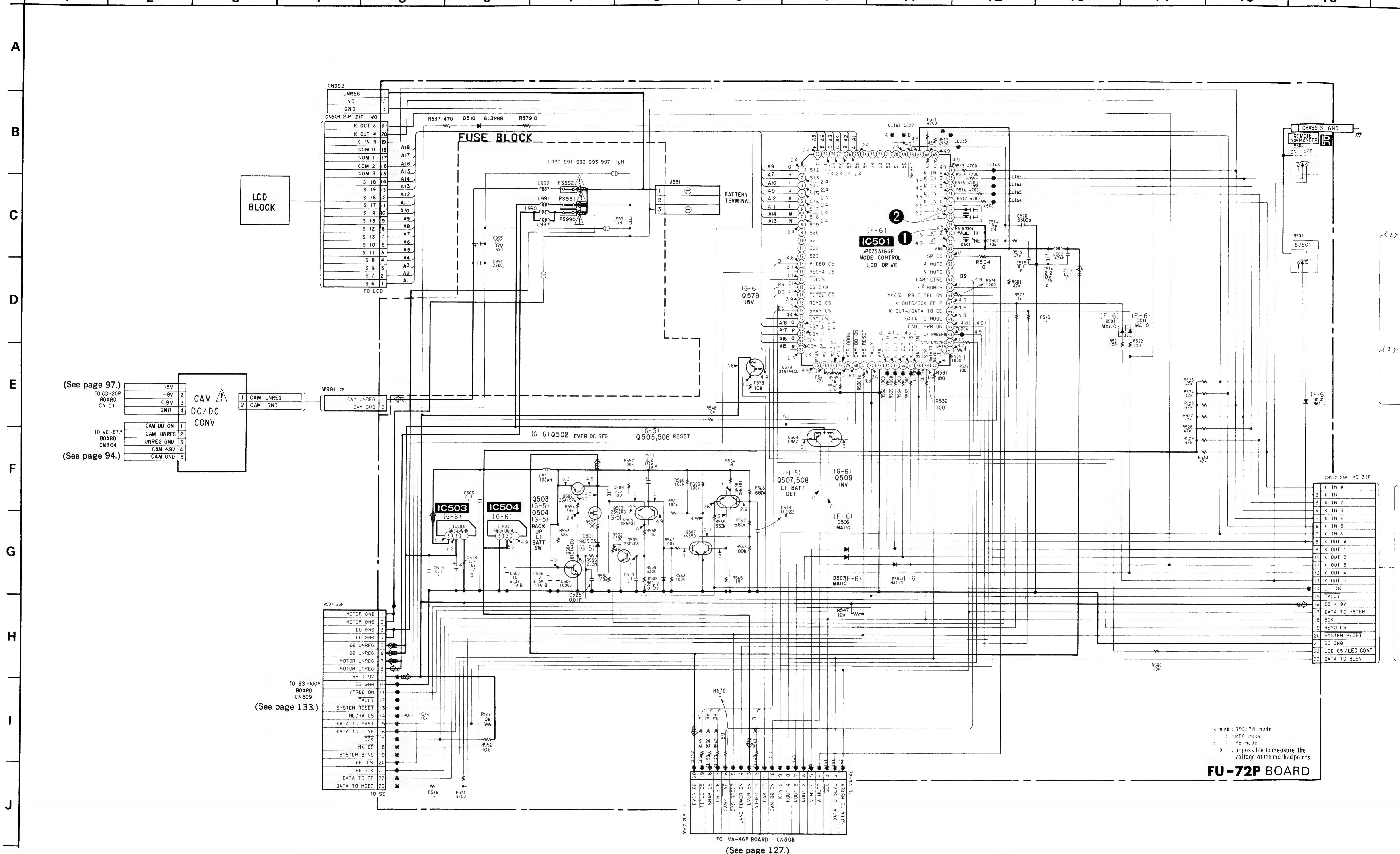
D920	8-719-941-34	DIODE GL1HD51-TE84L

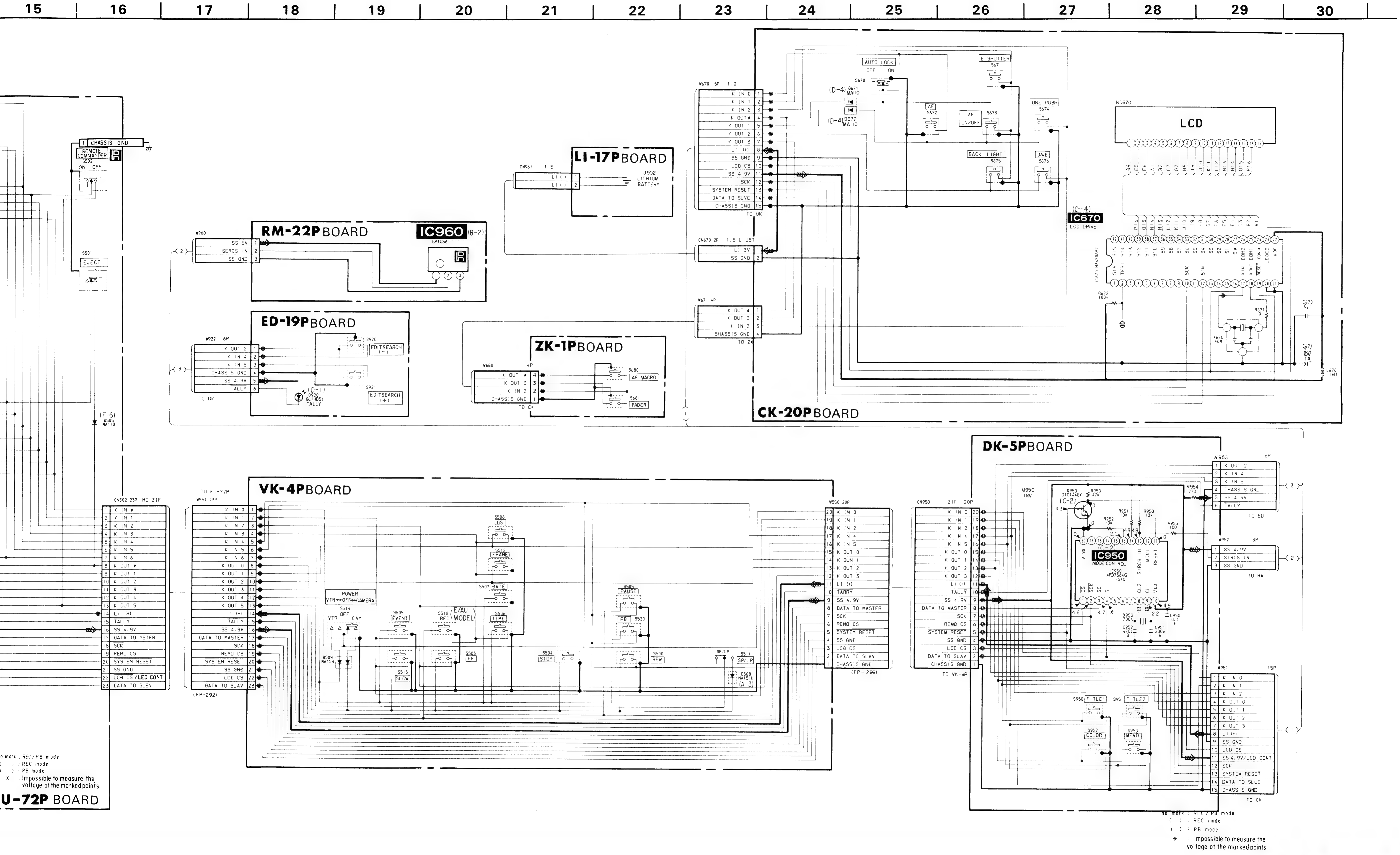
IC

IC960	8-749-921-76	IC GP1

CK-20P, DK-5P, ED-19P (FUNCTION SWITCH), FU-72P (MODE CONTROL), LI-17P (LITHIUM BATTERY), RM-22P (REMOTE CONTROL RECEIVER), VK-4P (FUNCTION SWITCH), ZK-1P (SWITCH) SCHEMATIC DIAGRAM

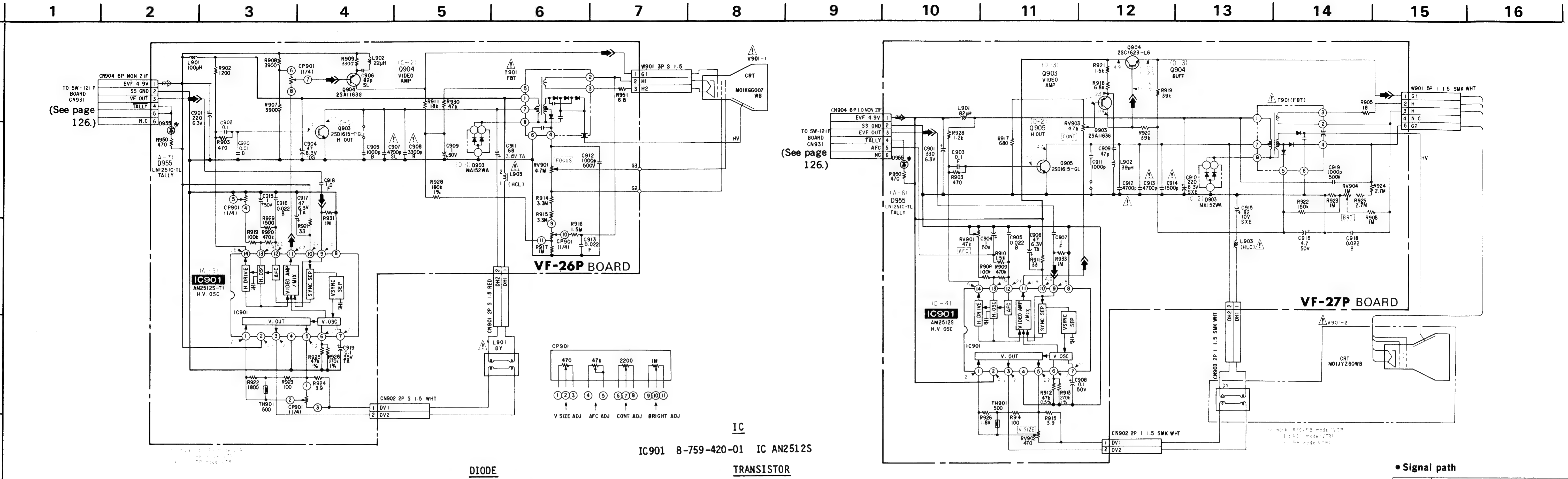
—Ref. No. CK-20P, DK-5P, ED-19P BOARDS : 5000 series, FU-72P BOARD : 6000 series, LI-17P, RM-22P, VK-4P, ZK-1P BOARDS : 7000 series—




15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
CK-20P BOARD
LI-17P BOARD
RM-22P BOARD
IC960
ED-19P BOARD
ZK-1P BOARD
VK-4P BOARD
DK-5P BOARD
FU-72P BOARD
LCD
IC670
LCD DRIVE
IC950
MODE CONTROL
AUTO LOCK
E SHUTTER
AF
ONE PUSH
BACK LIGHT
AWB
EJECT
REMOTE COMMANDER
CHASSIS GND
LITHIUM BATTERY
EDITSEARCH
TALLY
AF MACRO
FADER
POWER
VTR OFF CAMERA
EVENT
REC
TIME
DATE
FRAME
DS
SLOW
FF
STOP
PAUSE
PB
REW
SP/LP
TITLE1
TITLE2
COLOR
MEMO
TO DK
TO CK
TO ZK
TO ED
TO RM
TO VK-4P
no mark : REC/PB mode
( ) : REC mode
< > : PB mode
* : Impossible to measure the voltage at the marked points.

VF-26P, VF-27P (VIEWFINDER) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

—Ref. No. VF-26P BOARD: 8000 series, VF-27P BOARD: 9000 series



IC

IC901	8-759-420-01	IC AN2512S

DIODE

D903	8-719-400-20	DIODE MA152WA
D955	8-719-404-19	DIODE LN1251C

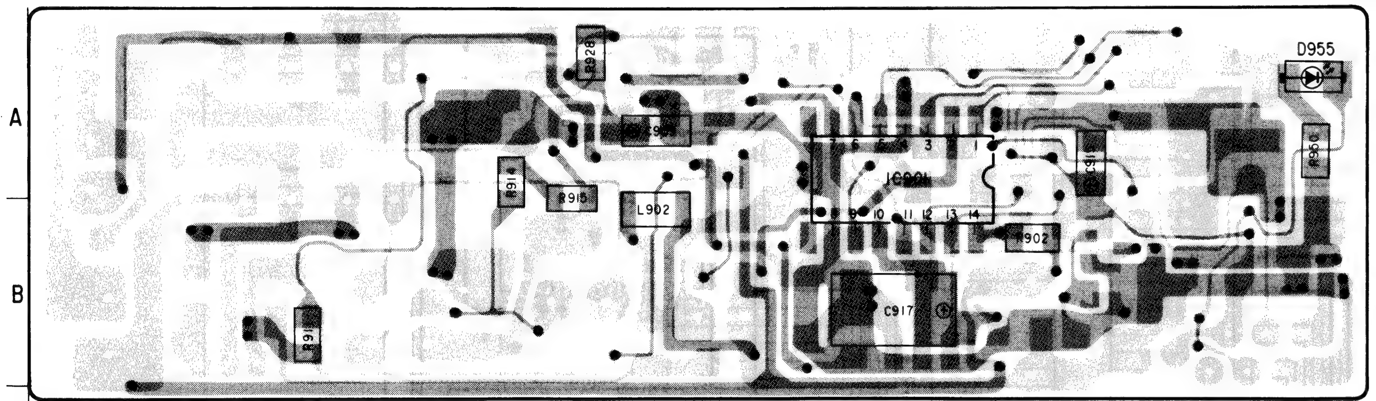
TRANSISTOR

Q903	8-729-106-68	TRANSISTOR 2SD1615
Q904	8-729-216-31	TRANSISTOR 2SA1163G

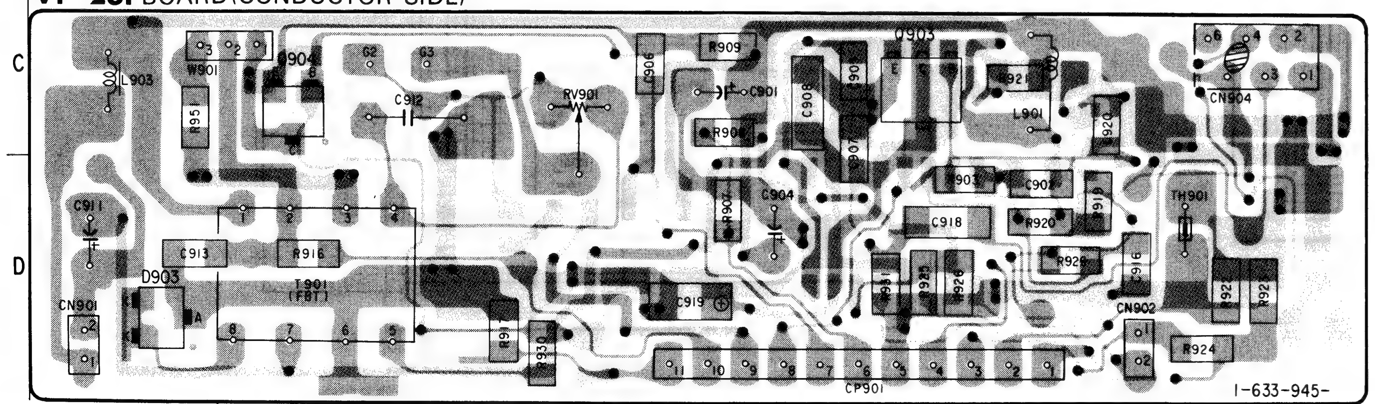
• Signal path

	VIDEO Signal		
	CHROMA	Y	Y/CH
REC	➡	➡	➡
PB	⇨	⇨	⇨

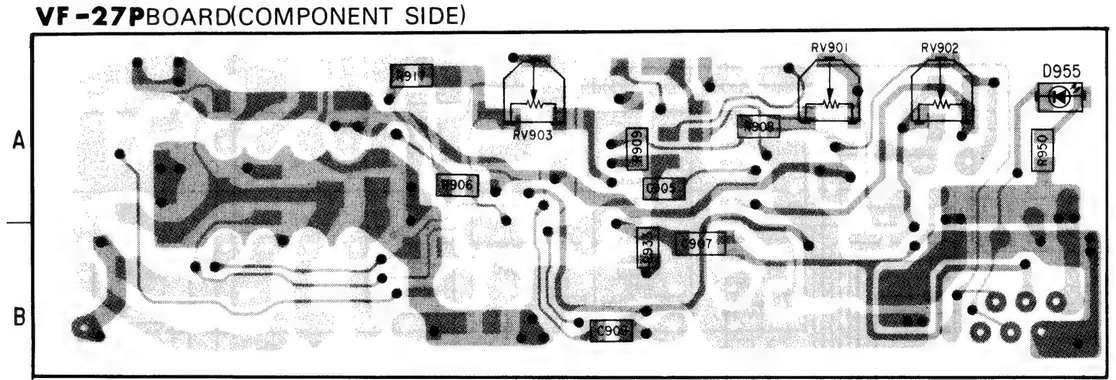
VF-26PBOARD(COMPONENT SIDE)



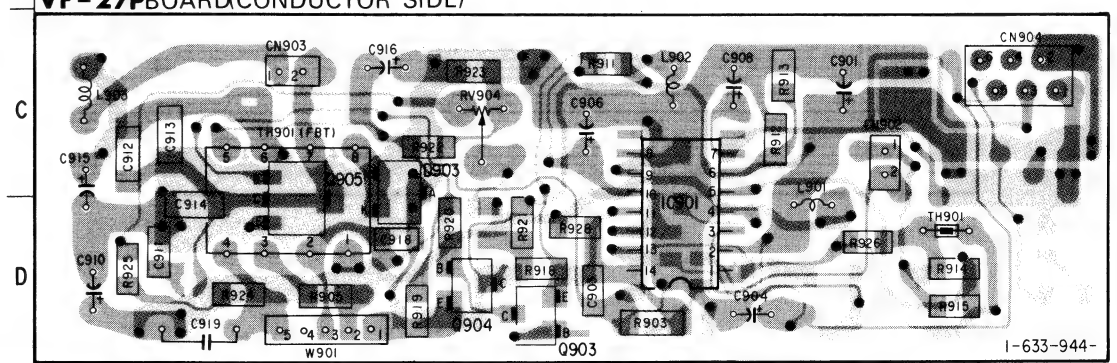
VF-26PBOARD(CONDUCTOR SIDE)



VF-27PBOARD(COMPONENT SIDE)



VF-27PBOARD(CONDUCTOR SIDE)



DIODE

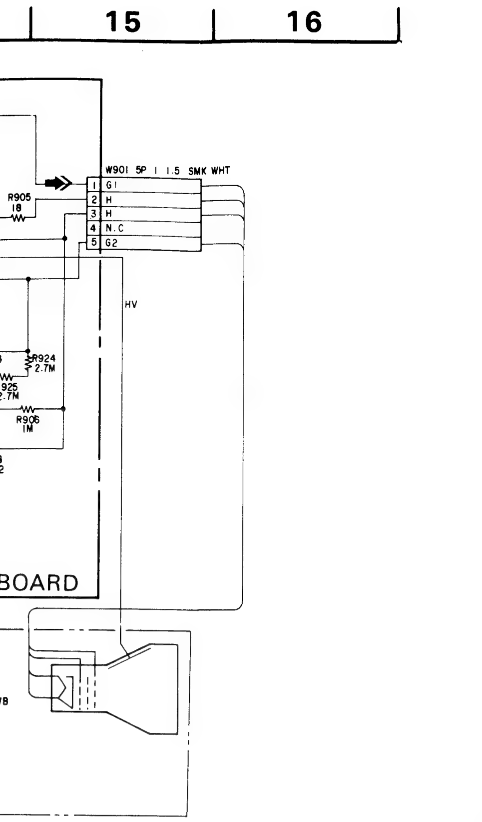
D903	8-719-400-20	DIODE MA152WA
D955	8-719-404-19	DIODE LN1251C

IC

IC901	8-759-420-01	IC AN2512S

TRANSISTOR

Q903	8-729-216-31	TRANSISTOR 2SA1163
Q904	8-729-100-66	TRANSISTOR 2SC1623
Q905	8-729-106-68	TRANSISTOR 2SD1615



• **Signal path**

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡	➡
PB	⇨	⇨	⇨

DIODE

D903 8-719-400-20 DIODE MA152WA
D955 8-719-404-19 DIODE LN1251C

IC

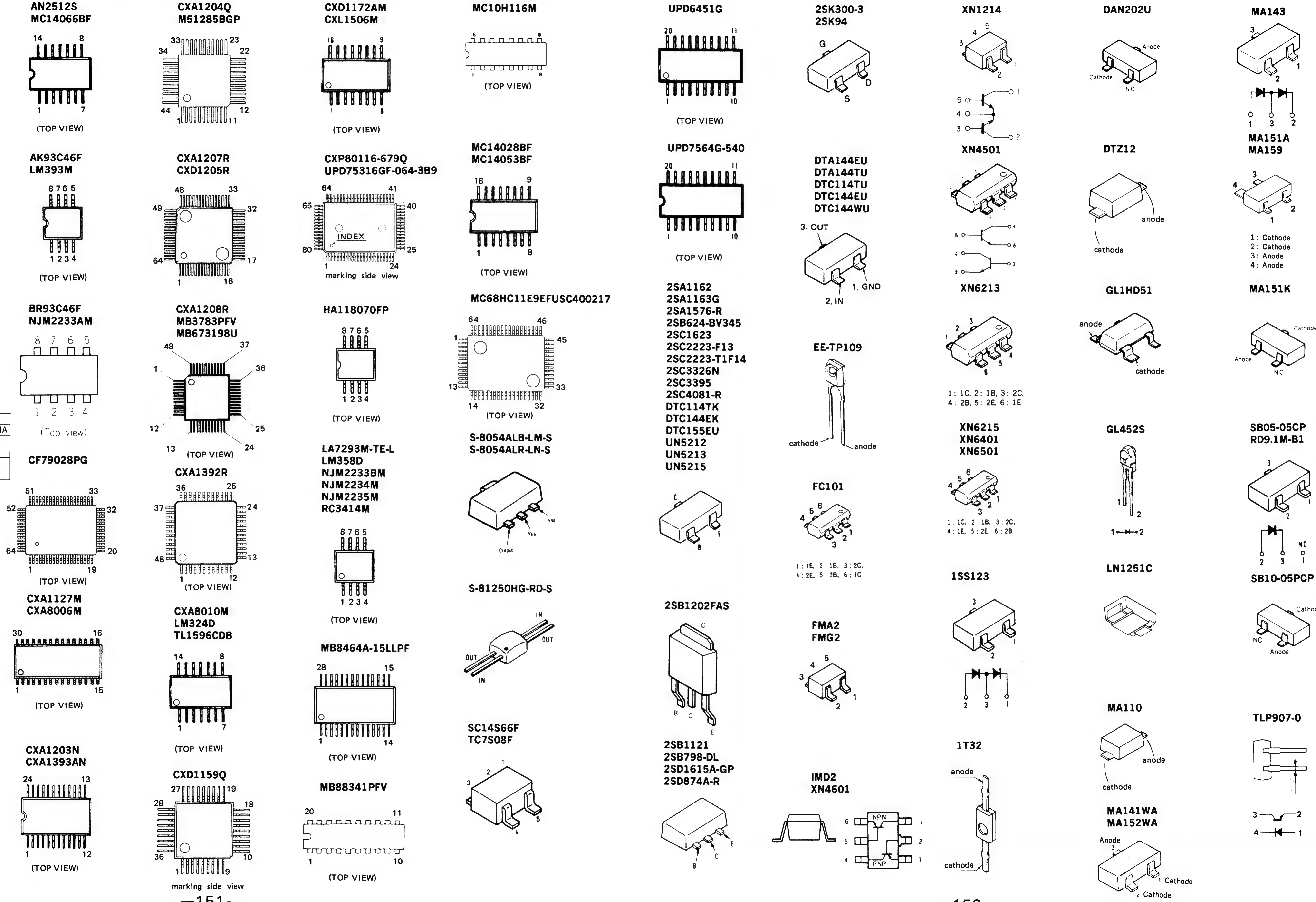
IC901 8-759-420-01 IC AN2512S

TRANSISTOR

Q903 8-729-216-31 TRANSISTOR 2SA1163G
Q904 8-729-100-66 TRANSISTOR 2SC1623
Q905 8-729-106-68 TRANSISTOR 2SD1615

21

4-3. SEMICONDUCTORS



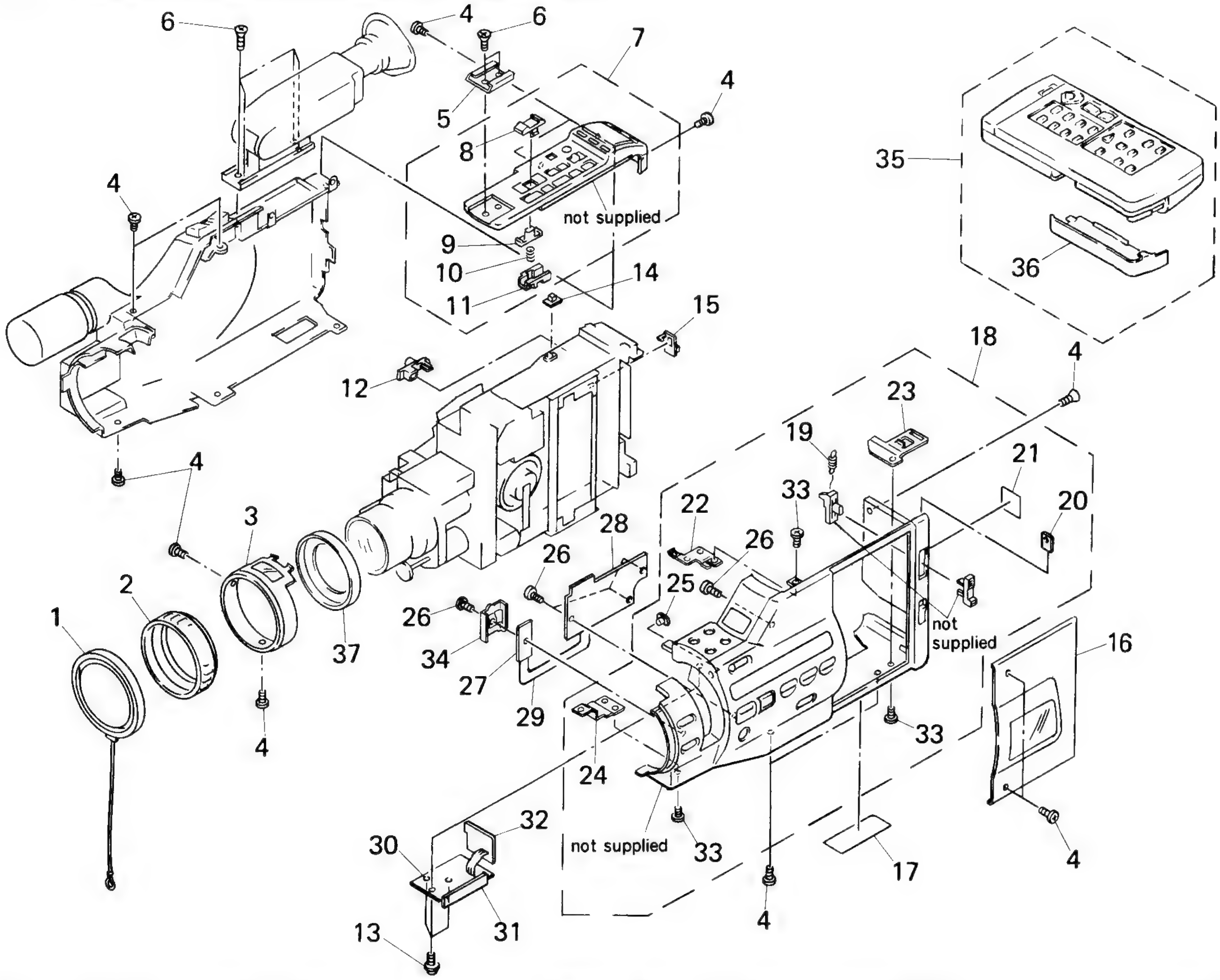
SECTION 5
EXPLODED VIEWS

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

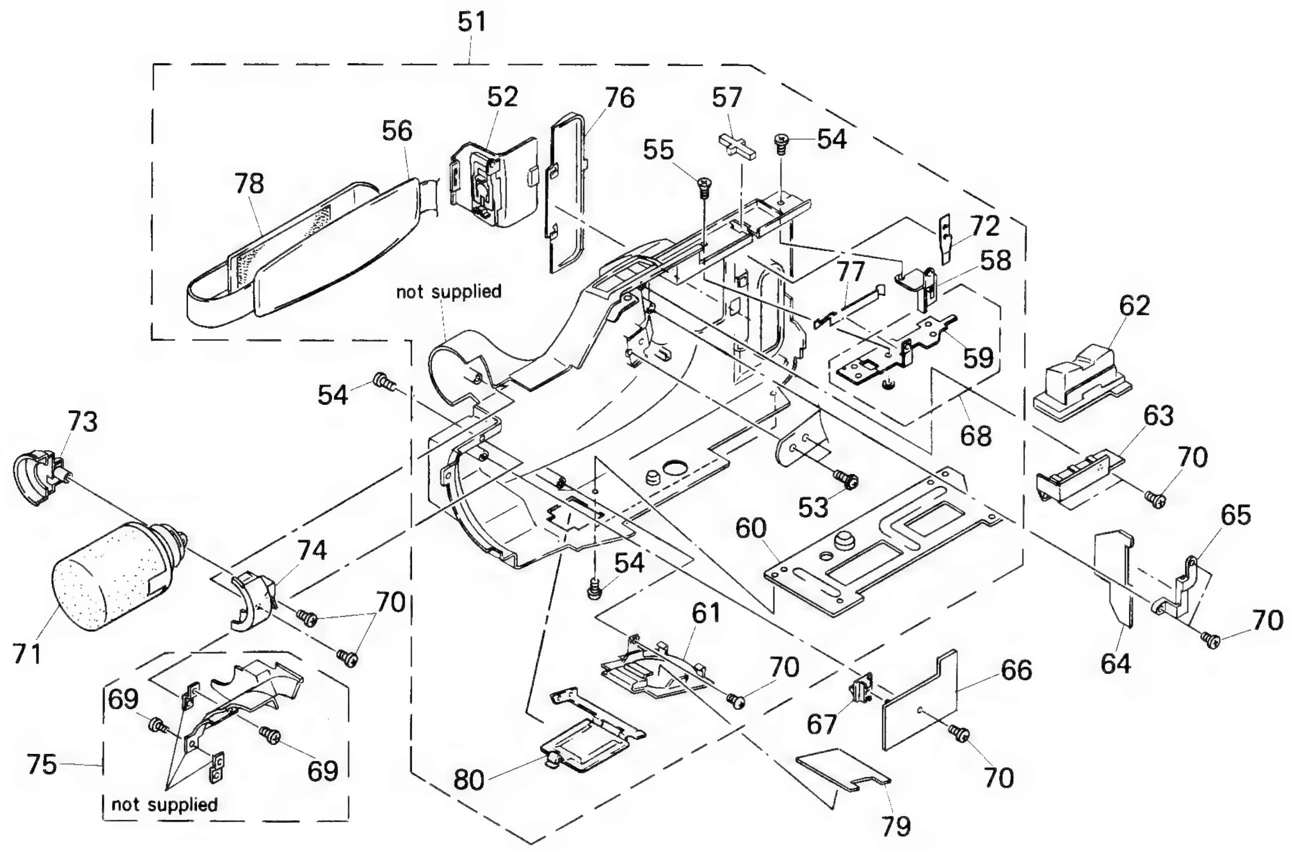
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. CABINET (R) AND VTR PANEL (L) ASSEMBLIES



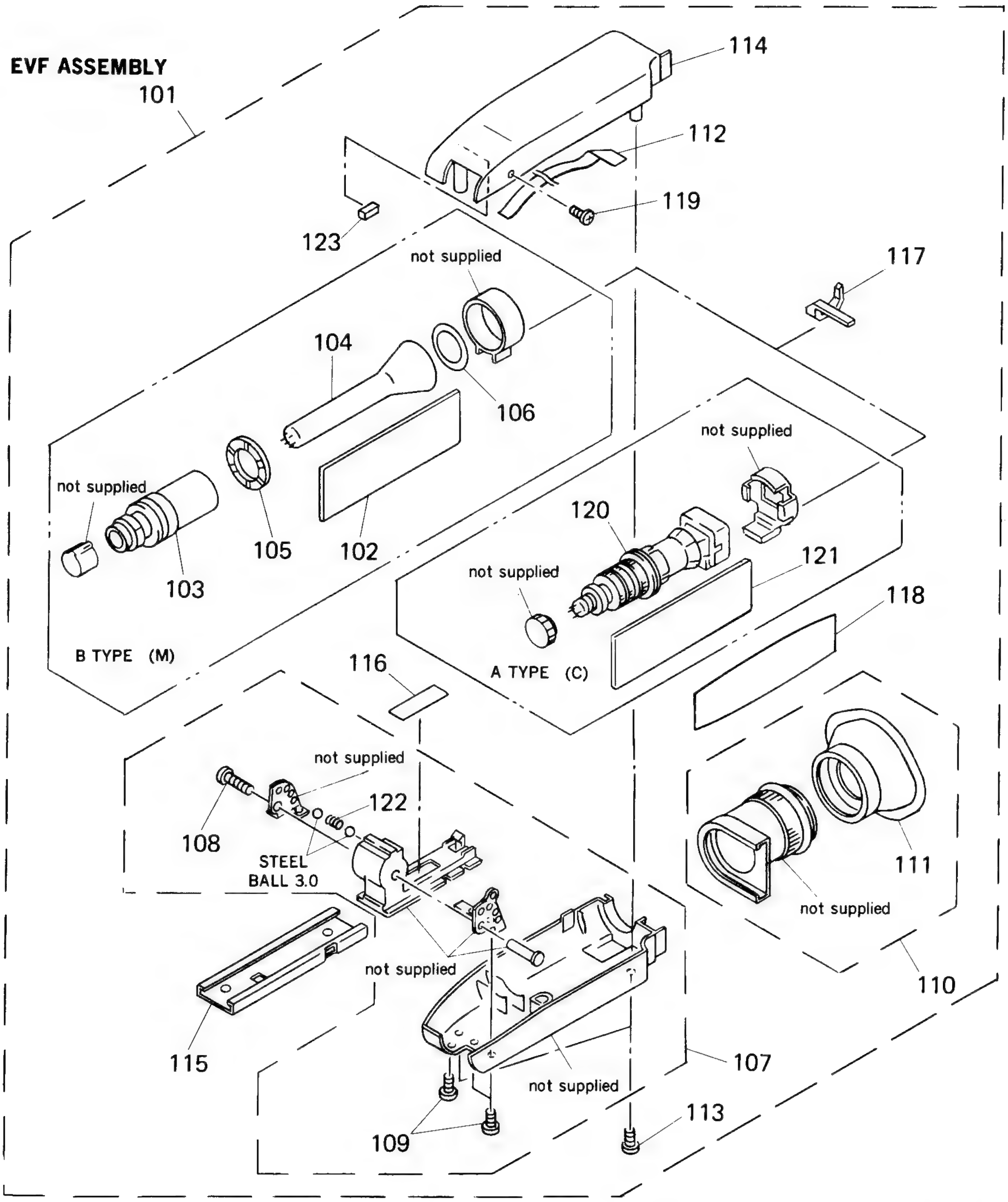
No.	Part No.	Description	Remark
1	A-7091-184-A	CAP BLOCK ASSY, HOOD	
2	3-728-269-01	HOOD	
3	X-3744-802-1	HOOP ASSY, LENS	
4	3-744-720-11	SCREW (M2X3)	
5	3-724-511-01	SHOE, ACCESSORY	
6	3-719-381-01	SCREW (M2X4)	
7	X-3744-870-1	PANEL (M) ASSY, VTR (AEP/UK MODEL)	8-11
	X-3749-153-1	PANEL (M) ASSY, VTR (E/AUS MODEL)	8-11
8	3-744-723-01	BUTTON (10), POWER	
9	*3-718-257-11	BUTTON, PUSH, POWER	
10	3-303-973-00	SPRING, COMPRESSION	
11	3-744-815-01	PLATE, BLIND, POWER	
12	3-744-897-01	KNOB, BILINGUAL	
13	3-669-480-21	+ PTPWH 2	
14	3-744-809-01	BUTTON, EDIT	
15	3-744-875-01	KNOB, REMOTE	
16	X-3744-872-1	LID (M) ASSY, CASSETTE	
17	*3-744-967-01	LABEL, MODEL NUMBER (AE) (AEP/UK MODEL)	
	*3-749-647-01	LABEL, MODEL NUMBER (E) (E/AUS MODEL)	
18	X-3744-871-1	CABINET (R) ASSY	19-26, 33
19	3-674-402-00	SPRING, TENSION	
20	3-718-233-01	NUT, PLATE	
21	*3-719-683-01	LABEL, BATTERY FITTING	
22	3-744-810-01	RETAINER, SHOE	
23	3-744-811-01	SHEET METAL (LOWER), STRAP	
24	3-744-821-01	JOINT, L/R	
25	3-744-847-01	GUIDE	
26	3-713-790-31	SCREW (M2X8), TAPPING, P3	
27	*1-634-736-21	ZK-1P BOARD	
28	*A-7052-313-A	CK-20P BOARD, COMPLETE	
29	1-633-985-11	FP-298 FLEXIBL BOARD	
30	*A-7062-312-A	DK-5P BOARD, COMPLETE	
31	*A-7071-203-A	ED-19P BOARD, COMPLETE	
32	*A-7062-310-A	RM-22P BOARD, COMPLETE	
33	3-744-720-11	SCREW (M2X3)	
34	3-744-812-01	SHEET METAL, ZK	
35	1-465-395-41	COMMEANDER, REMOTE (RMT-502) (AUS/E MODEL)	36
	1-465-395-81	COMMEANDER, REMOTE (RMT-502) (AEP/UK MODEL)	36
36	3-724-854-01	CASE, BATTERY	
37	3-744-839-01	RING, CHANGE	

5-2. CABINET (L) ASSEMBLY



No.	Part No.	Description	Remark
51	A-7081-147-D	CABINET (L) BLOCK ASSY (E/AUS MODEL) 52-61, 68, 70, 72, 77, 78, 80	
	A-7081-250-A	CABINET (L) BLOCK ASSY (AEP/UK MODEL) 52-61, 68, 70, 72, 77, 78, 80	
52	X-3744-825-1	KNOB ASSY, SP	
53	3-669-480-21	+ PTPWH 2	
54	3-719-381-01	SCREW (M2X4)	
55	3-719-831-21	SCREW (M2X4)	
56	3-724-591-01	PAD, GRIP	
57	3-744-709-01	LOCK, SLIDE	
58	3-744-804-01	SHEET METAL (UPPER), STRAP	
59	3-744-832-01	RETAINER, EVF	
60	X-3749-071-2	SHEET METAL ASSY, TRIPOD	
61	3-744-841-01	HOLDER, LI PC BOARD	
62	1-572-286-11	SWITCH, PUSH (ZOOM)	
63	3-744-805-01	BUTTON (BASE), ZOOM	
64	*A-7071-207-A	SW-121P BOARD, COMPLETE	
65	3-744-808-01	RETAINER, SW	
66	*A-7062-314-A	MC-44P BOARD, COMPLETE	
67	3-744-807-01	BUTTON, MICROPHONE	
68	X-3744-828-1	RETAINER ASSY, EVF	59
69	3-744-720-11	SCREW (M2X3)	
70	3-713-790-21	SCREW (M2X6), TAPPING, P3	
71	1-542-146-11	MICROPHONE, CONDENSER (STEREO)	
72	3-744-872-01	SPRING, CN	
73	3-744-833-01	HOLDER, MICROPHONE	
74	3-744-834-01	HOUSING, MICROPHONE	
75	X-3744-803-1	COVER ASSY, LENS	69
76	3-744-874-41	LID, CONNECTOR	
77	3-744-876-01	SPRING, EVF LOCK	
78	3-739-866-81	BELT, GRIP	
79	*1-634-737-21	LI-17P BOARD	
80	3-744-840-01	LID, BATTERY CASE	

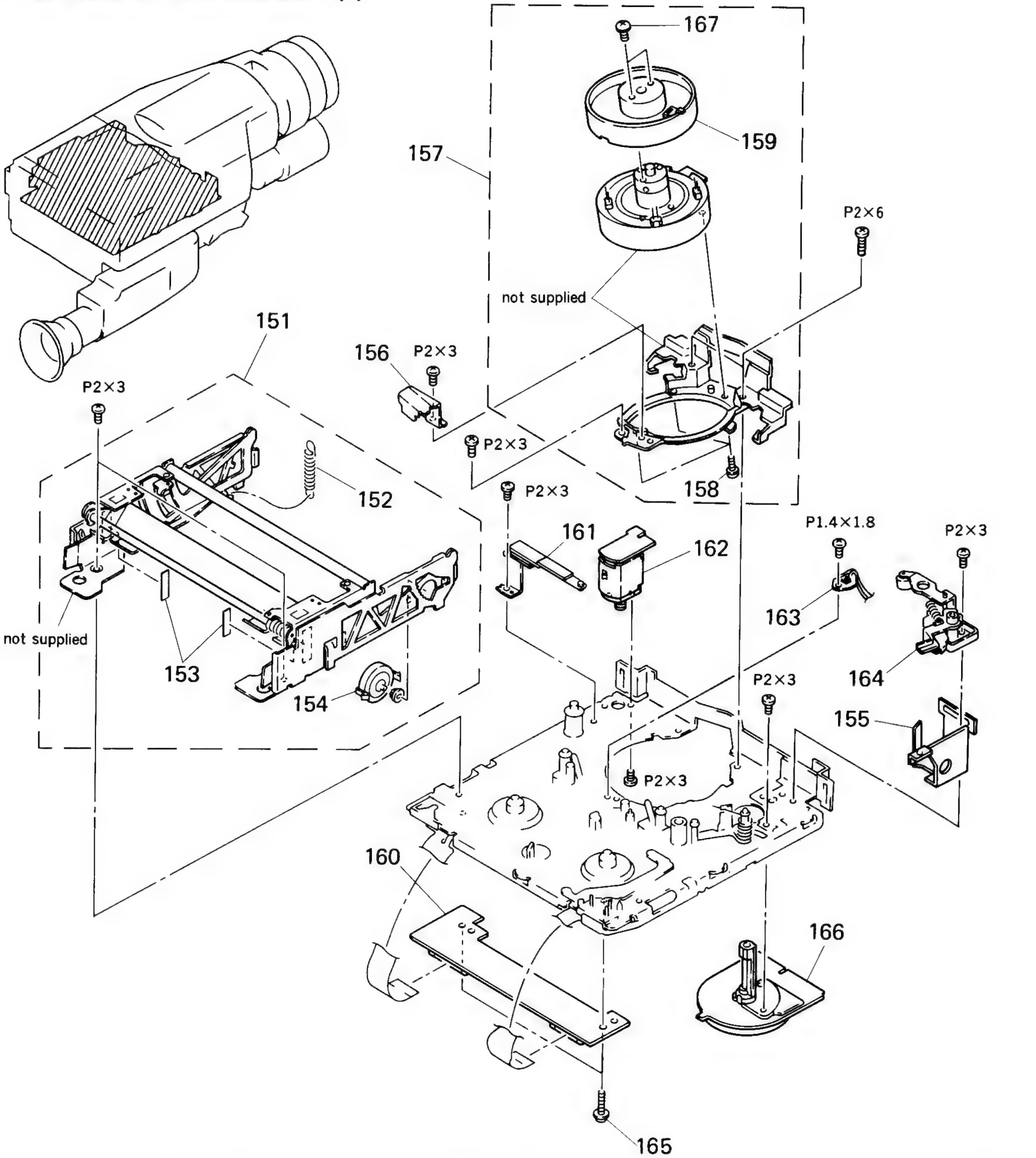
5-3. EVF ASSEMBLY



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

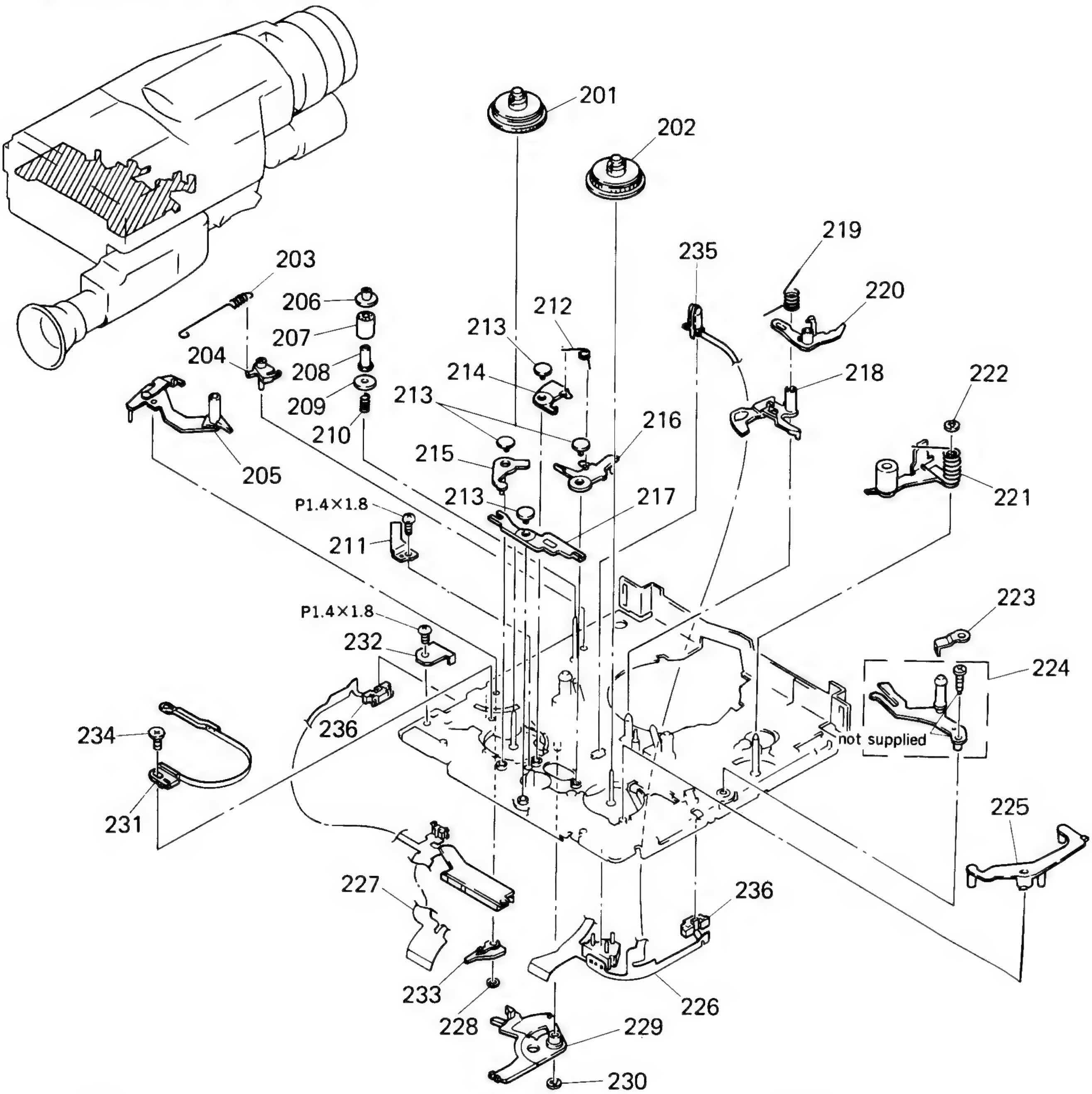
No.	Part No.	Description	Remark
101	A-7019-243-A	EVF (M) ASSY	102-119, 123
	A-7019-244-A	EVF (C) ASSY	107-122
102	*A-7062-278-A	VF-26P BOARD, COMPLETE	
103	⚠.1-451-310-21	DEFLECTION YOKE (B/W)	
104	⚠.1-546-085-11	CATHODE-RAY TUBE, B/W	
105	3-724-549-01	LOCK, CRT	
106	3-724-570-01	RING, CRT FIXED	
107	X-3744-701-1	CASE ASSY, LOWER, VF	108, 109, 122
108	3-732-012-11	SCREW (M2X5)	
109	3-719-381-01	SCREW (M2X4)	
110	X-3744-703-1	EYE BLOCK ASSY	111
111	3-733-922-01	EYE CUP	
112	1-634-011-11	FP-264 FLEXIBLE BOARD	
113	3-713-790-31	SCREW (M2X8), TAPPING, P3	
114	3-744-705-01	CASE, VF (UPPER)	
115	3-744-712-01	SHOE, VF	
116	3-744-716-01	COVER, FL	
117	3-744-722-01	GUIDE, VF TALLY	
118	3-744-775-01	INSULATOR, VF	
119	3-744-720-11	SCREW (M2X3)	
120	⚠.1-452-482-11	CRT ASSY (M91JYZ60WB)	
121	*A-7062-279-A	VF-27P BOARD, COMPLETE	
122	3-302-492-00	SPRING, COMPRESSION	
123	9-911-844-XX	CUSHION, CRT	

5-4. MECHANICAL DECK ASSEMBLY (1)



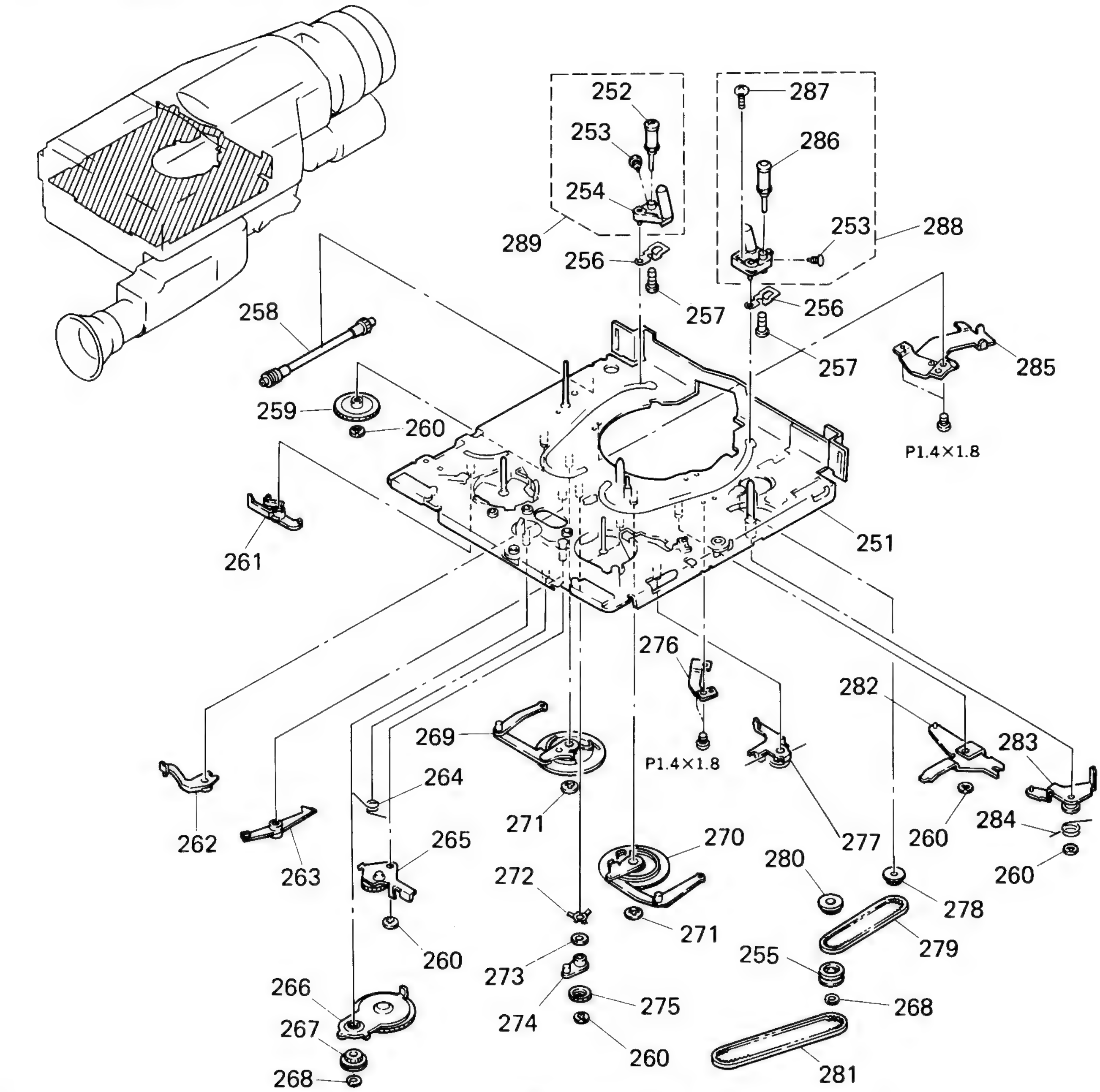
No.	Part No.	Description	Remark
151	X-3728-874-1	CASSETTE COMPARTMENT ASSY (N) (AEP/UK MODEL)	152-154
	X-3940-095-1	CASSETTE COMPARTMENT ASSY (N) (E/AUS MODEL)	152-154
152	3-728-825-03	SPRING, TENSION	
153	*3-728-829-01	TAPE	
154	3-728-867-02	DAMPER, OIL	
155	3-744-114-01	BASE (RP)	
156	3-728-868-01	GUARD, GUIDE	
157	A-7048-404-A	DRUM ASSY (DGU-63A-R)	158, 159, 167
158	3-686-493-01	SCREW (M2X5), P1	
159	A-7049-342-A	DRUM ASSY, UPPER, ROTARY (DGR-63-R)	
160	*1-633-941-21	CC-31P BOARD	
161	X-3728-864-1	GROUND ASSY, SHAFT	
162	A-7040-208-A	MOTOR ASSY, THREADING (LOADING) (M903)	
163	1-808-505-22	SENSOR (DEW)	
164	A-7040-207-A	ROLLER BLOCK ASSY, HC	
165	3-713-790-01	SCREW (M2X5), TAPPING, P3	
166	8-835-331-01	MOTOR, DC U-22A (CAPSTAN) (M902)	
167	3-727-847-01	SCREW (M2X4)	

5-5. MECHANICAL DECK ASSEMBLY (2)



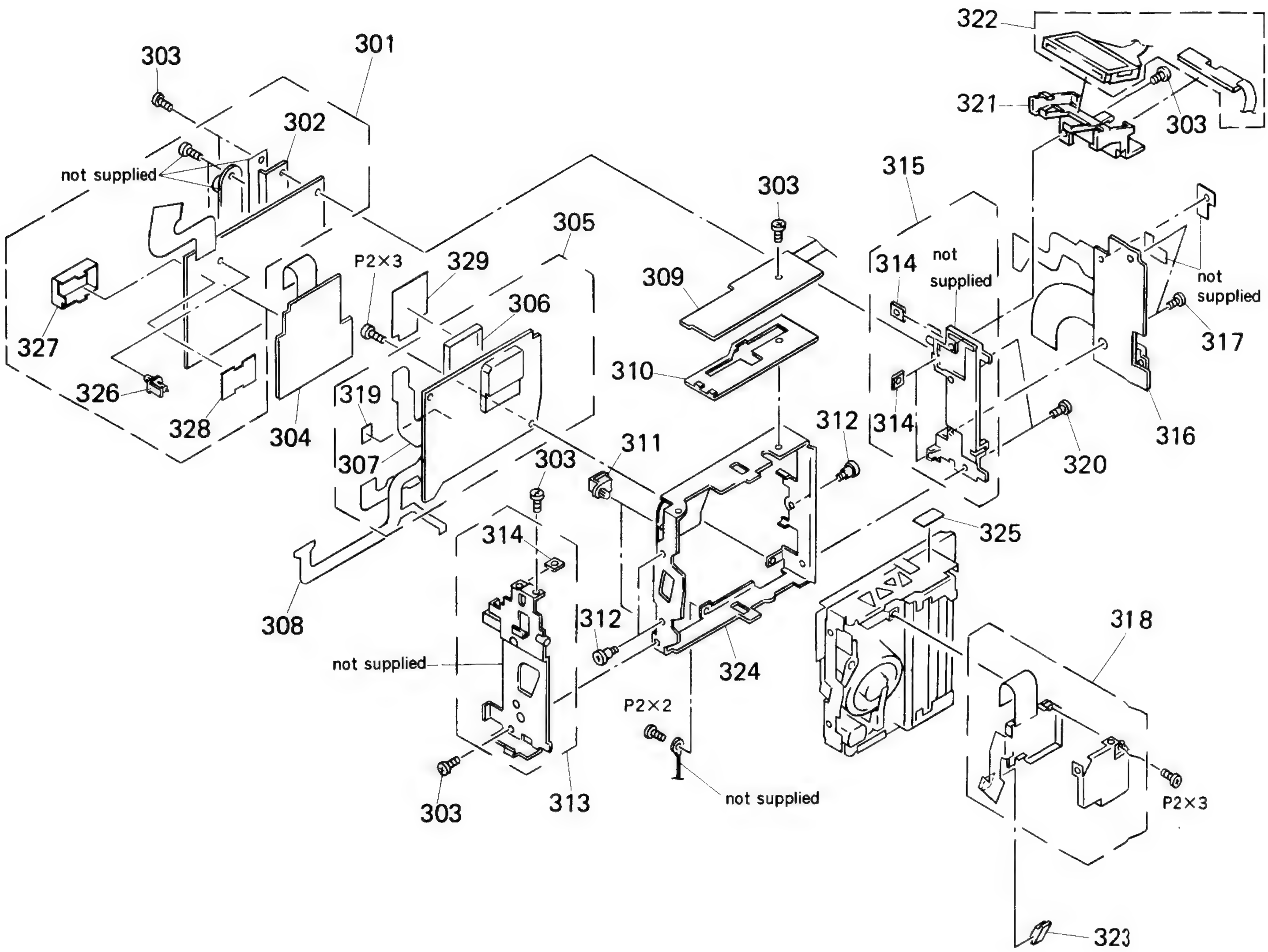
No.	Part No.	Description	Remark
201	X-3728-851-1	TABLE ASSY, REEL, S	
202	X-3728-855-1	TABLE ASSY, REEL, T	
203	3-736-414-01	SPRING, TENSION	
204	3-728-855-03	ARM, ADJUSTMENT	
205	X-3728-867-1	ARM ASSY (S), TENSION REGULATOR	
206	3-726-884-01	FLANGE, UPPER, TG2	
207	3-726-883-01	ROLLER, TG2	
208	3-726-885-01	SLEEVE, TG2	
209	3-726-882-02	FLANGE, LOWER, TG2	
210	3-726-886-01	SPRING, COMPRESSION	
211	3-726-848-01	RETAINER, TL	
212	3-726-866-01	SPRING (ST), TORSION	
213	3-726-858-01	PIN, SHAFT RETAINER	
214	3-728-849-01	BRAKE, S	
215	3-726-852-01	BRAKE, LB	
216	3-728-850-01	BRAKE, T	
217	3-726-853-01	LEVER, LB	
218	3-728-875-01	STOPPER, RK	
219	3-726-864-01	SPRING (RK), TORSION	
220	3-728-852-02	ARM, RK STOPPER	
221	A-7040-219-A	ARM BLOCK ASSY, PINCH	
222	3-669-465-00	WASHER (1.5), STOPPER	
223	3-728-808-01	SPRING, LEAF	
224	X-3728-869-1	ARM ASSY, TG7	
225	3-728-848-01	ARM, LB RELEASE	
226	1-628-061-12	FP-90 FLEXIBLE BOARD	
227	1-628-060-12	FP-89 FLEXIBLE BOARD	
228	3-321-393-11	WASHER, STOPPER	
229	X-3728-863-1	LEVER ASSY, SW	
230	3-726-829-01	WASHER, STOPPER	
231	X-3728-859-1	BAND ASSY, TENSION REGULATOR	
232	3-730-125-01	RETAINER, SW	
233	X-3728-857-1	STOPPER ASSY, TENSION REGULATOR	
234	3-726-822-01	SCREW (M1.4X2) (STEP), HEAD	
235	3-728-837-01	HOLDER, LED	
236	3-728-869-02	HOLDER, SENSOR	

5-6. MECHANICAL DECK ASSEMBLY (3)



No.	Part No.	Description	Remark
251	X-3728-862-1	CHASSIS ASSY, MECHANICAL	
252	X-3726-820-1	ROLLER ASSY (U), GUIDE	
253	3-726-822-01	SCREW (M1.4X2) (STEP), HEAD	
254	X-3726-818-1	COASTER (LEFT) ASSY	
255	3-741-196-01	PULLEY (LOWER), BELT MIDWAY	
256	3-736-485-01	SPRING, LEAF, COSTER	
257	3-726-830-01	SCREW (M1.4X4) (THREE LOCK)	
258	X-3728-868-1	WORM ASSY	
259	3-744-109-01	GEAR, WHEEL	
260	3-726-829-01	WASHER, STOPPER	
261	3-728-842-01	LEVER, EJECT	
262	3-728-851-01	BRAKE, UL	
263	3-726-854-01	ARM, BRAKE RELEASE	
264	3-726-865-01	SPRING (LB), TORSION	
265	A-7040-225-A	GEAR BLOCK ASSY (N), LB	
266	X-3728-866-1	GEAR ASSY, RK	
267	X-3728-858-1	GEAR ASSY, RC	
268	3-321-393-11	WASHER, STOPPER	
269	X-3728-842-1	GEAR (LEFT) ASSY, DRIVE	
270	X-3728-843-1	GEAR (RIGHT) ASSY, DRIVE	
271	3-669-465-00	WASHER (1.5), STOPPER	
272	3-726-867-01	SPRING, LEAF	
273	3-701-436-21	WASHER, POLYEHTHYLENE	
274	3-726-857-02	ARM, UL	
275	3-726-856-02	GEAR, UL	
276	*3-726-805-01	REINFORCEMENT (TT)	
277	X-3726-808-2	BRAKE ASSY, TS	
278	X-3726-805-1	GEAR ASSY, JOINT	
279	3-728-866-11	BELT (S), TIMING	
280	X-3726-838-1	PULLEY (UPPER) ASSY, MIDWAY	
281	3-741-197-01	BELT (L), TIMING	
282	X-3728-846-1	LEVER ASSY, LOADING	
283	X-3726-824-1	ARM ASSY, PINCH SUB	
284	3-726-895-01	SPRING	
285	X-3726-841-1	REINFORCEMENT (SS) ASSY	
286	X-3728-810-1	ROLLER ASSY (U)(PLATING), GUIDE	
287	3-736-473-01	SCREW (M2X0.25) (THREE LOCK)	
288	A-7040-217-A	COASTER (RIGHT)BLOCK ASSY(N1P)	253, 286, 287
289	A-7040-128-A	COASTER (LEFT) BLOCK ASSY	252-254

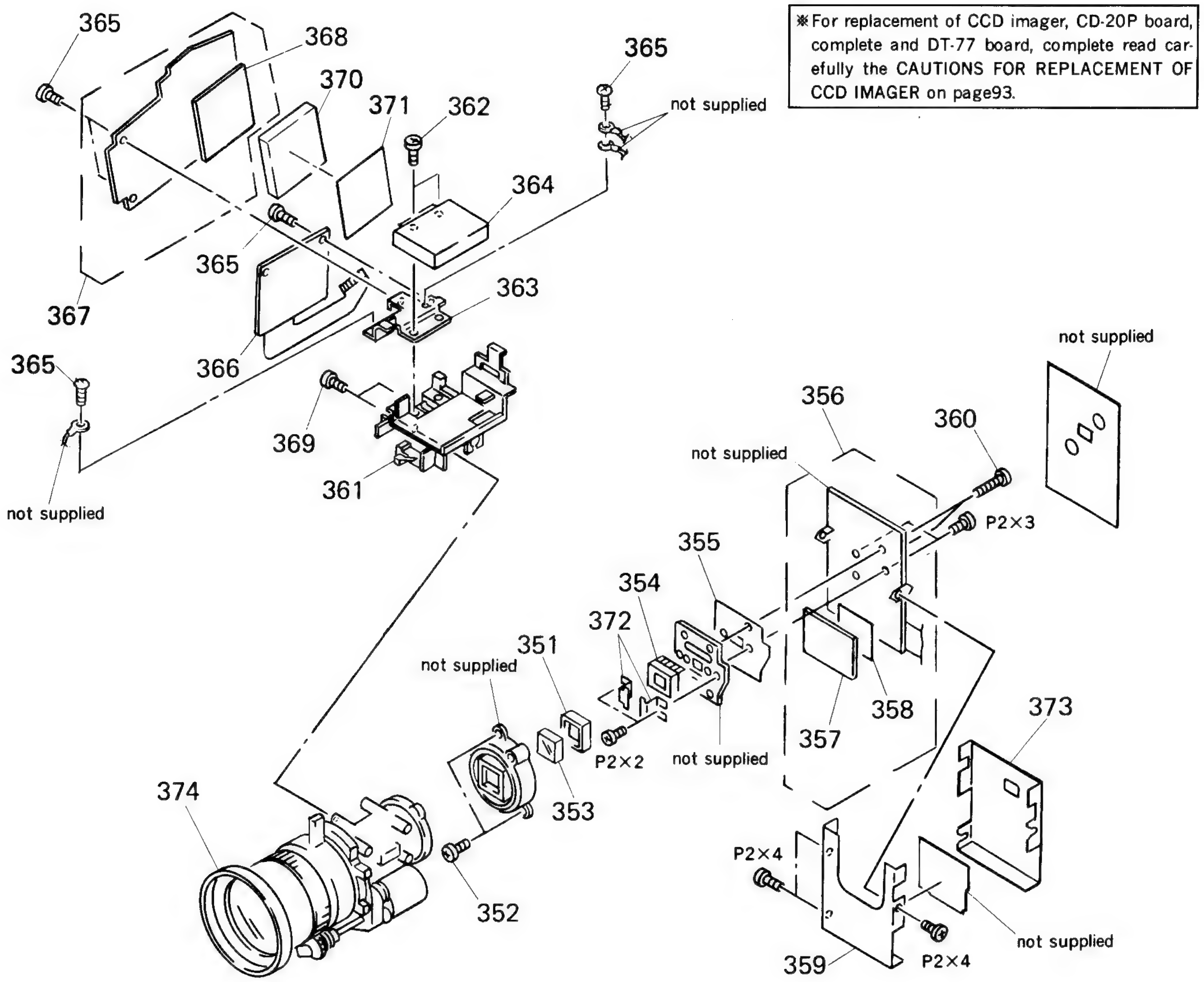
5-7. MAIN BOARDS ASSEMBLY



No.	Part No.	Description	Remark
301	*A-7062-307-A	VA-46P BOARD, COMPLETE (AEP/UK MODEL)	302
301	*A-7062-394-A	VA-46P BOARD, COMPLETE (E/AUS MODEL)	
302	X-3744-801-1	REINFORCEMENT ASSY, VA	
303	3-719-381-01	SCREW (M2X4)	
304	*A-7062-308-A	CT-21P BOARD, COMPLETE	
305	*A-7062-306-A	SS-100P BOARD, COMPLETE	306
306	*X-3744-601-1	CASE ASSY (DD-B), SHIELD	
307	1-633-924-11	FP-248 FLEXIBL BOARD	
308	1-633-922-11	FP-249 FLEXIBL BOARD	
309	*1-633-930-21	VK-4P BOARD	
310	*3-744-849-01	PLATE, BOTTOM, VTR	
311	3-744-609-01	HINGE (C), PC BOARD	
312	3-744-603-01	SCREW	
313	X-3744-805-1	HOLDER ASSY, MD	314
314	3-718-233-01	NUT, PLATE	
315	X-3744-810-1	FRAME (R) ASSY, MD	314
316	*A-7062-309-A	FU-72P BOARD, COMPLETE	
317	3-713-790-01	SCREW (M2X5), TAPPING, P3	
318	8-741-509-11	IC SBX1509-11 (RP-77 BOARD)	
319	3-831-441-11	SPACER	
320	3-719-831-21	SCREW (M2X4)	
321	*3-744-905-01	HOLDER, LCD	
322	1-809-023-11	DISPLAY PANEL, LIQUID CRYSTAL	
323	1-569-347-11	CONNECTOR, FPC (TRANSLATION) 13P	
324	X-3744-602-1	FRAME ASSY, MD	
325	*3-730-176-11	SHEET, MD	
326	3-744-842-01	SUPPORT, CT, PC BOARD	
327	*3-744-816-01	CASE (MAIN), SHIELD, VA	
328	*3-744-817-01	CASE (BOTTOM), SHIELD, VA	
329	*3-744-890-01	PLATE, PROTECTION, FLEXIBLE	

5-8. CAMERA BLOCK ASSEMBLY

※For replacement of CCD imager, CD-20P board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page93.



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
351	*3-725-177-01	RUBBER, SEAL	
352	3-738-519-11	SCREW (M2X3), +B	
353	1-547-381-12	FILTER BLOCK, OPTICAL	
354	※8-752-604-72	IC ICX039AN-2 (CCD IMAGER)	
355	*3-725-180-01	SHEET, INSULATING, CCD HOLDER	
356	*A-7062-270-A	CD-20P BOARD, COMPLETE	357, 358
357	A-7068-173-A	DT-77F BOARD, COMPLETE (HIC)	
358	*X-3739-811-1	PLATE ASSY, SHIELD, CD	
359	*X-3744-702-1	CASE (MAIN) ASSY, SHIELD, C	
360	3-335-640-51	SCREW (M2X16)	
361	*X-3744-808-1	HOLDER ASSY, LENS	
362	3-713-790-21	SCREW (M2X6), TAPPING, P3	
363	*3-744-818-01	PLATE, GROUND, CAMERA	
364	⚠.1-466-230-21	CONVERTER UNIT, D/D	
365	3-719-381-01	SCREW (M2X4)	
366	*A-7062-271-A	AF-54P BOARD, COMPLETE	
367	*A-7062-268-A	VC-67P BOARD, COMPLETE	368
368	*A-7068-180-A	MX-12AP BOARD, COMPLETE	
369	3-719-408-01	SCREW (B2), TAPPING, P3	
370	*3-744-763-01	CASE, SHIELD, VC	
371	*3-744-892-01	INSULATOR, VC	
372	*3-725-175-01	STOPPER, CCD	
373	*3-744-702-01	LID, C SHIELD CASE	
374	1-547-422-11	LENS, ZOOM (VCL-8508XE)	

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA...,
UPC...: μPC, UPD...: μPD...

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
	*A-7062-307-A	VA-46P BOARD, COMPLETE (AEP/UK MODEL)			
		***********************			
	*A-7062-394-A	VA-46P BOARD, COMPLETE (E/AUS MODEL)			
		***********************			
		(Ref.No 3,000 Series)			
	1-569-556-11	JACK			
	1-633-976-11	FP-251 FLEXIBLE BOARD			
	3-719-695-01	SCREW (M1.7X3.5), SPECIAL HEAD			
	*3-744-816-01	CASE (MAIN), SHIELD, VA			
	*3-744-817-01	CASE (BOTTOM), SHIELD, VA			
		CAPACITOR			
C002	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C071	1-128-004-11	ELECT CHIP	10MF	20%	16V
C072	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C101	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C102	1-128-004-11	ELECT CHIP	10MF	20%	16V
C103	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C104	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C105	1-162-965-11	CERAMIC CHIP	0.0015MF	10%	50V
C106	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C108	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C109	1-162-937-11	CERAMIC CHIP	6PF	0.5PF	50V
C110	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C111	1-162-995-11	CERAMIC CHIP	0.022MF		50V
C112	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C113	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C114	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C117	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C121	1-164-222-11	CERAMIC CHIP	0.22MF		25V
C122	1-128-004-11	ELECT CHIP	10MF	20%	16V
C123	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C125	1-164-458-11	CERAMIC CHIP	43PF	5%	50V
C127	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C129	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C131	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C132	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C134	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C135	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C137	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C141	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C143	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C144	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C145	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C146	1-162-995-11	CERAMIC CHIP	0.022MF		50V
C147	1-162-995-11	CERAMIC CHIP	0.022MF		50V
C171	1-124-778-00	ELECT CHIP	22MF	20%	6.3V
C172	1-162-943-11	CERAMIC CHIP	15PF	5%	50V
C181	1-164-005-11	CERAMIC CHIP	0.47MF		25V
C182	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C183	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C201	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C202	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C203	1-164-005-11	CERAMIC CHIP	0.47MF		25V
C204	1-128-004-11	ELECT CHIP	10MF	20%	16V
C205	1-128-004-11	ELECT CHIP	10MF	20%	16V
C206	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C207	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C208	1-126-200-11	ELECT CHIP	10MF	20%	35V
C209	1-126-154-11	ELECT	47MF	20%	6.3V
C210	1-128-008-11	ELECT CHIP	3.3MF	20%	35V
C211	1-128-004-11	ELECT CHIP	10MF	20%	16V
C212	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C213	1-128-008-11	ELECT CHIP	3.3MF	20%	35V
C214	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C215	1-128-004-11	ELECT CHIP	10MF	20%	16V
C216	1-126-607-11	ELECT CHIP	47MF	20%	4V
C217	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C218	1-126-209-11	ELECT CHIP	100MF	20%	4V
C219	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C220	1-162-943-11	CERAMIC CHIP	15PF	5%	50V
C221	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C222	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C224	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V
C225	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C226	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C227	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V
C228	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C229	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V
C230	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C231	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C232	1-162-638-11	CERAMIC CHIP	1MF		16V
C233	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C234	1-135-157-21	TANTAL. CHIP	10MF	20%	6.3V
C235	1-135-157-21	TANTAL. CHIP	10MF	20%	6.3V
C236	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C237	1-128-004-11	ELECT CHIP	10MF	20%	16V
C238	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C239	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C240	1-128-004-11	ELECT CHIP	10MF	20%	16V
C241	1-135-201-11	TANTAL. CHIP	10MF	20%	4V
C242	1-128-003-11	ELECT CHIP	22MF	20%	4V
C243	1-135-211-11	TANTAL. CHIP	6.8MF	20%	6.3V
C244	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C246	1-128-003-11	ELECT CHIP	22MF	20%	4V
C247	1-164-005-11	CERAMIC CHIP	0.47MF		25V
C248	1-128-004-11	ELECT CHIP	10MF	20%	16V
C249	1-128-004-11	ELECT CHIP	10MF	20%	16V
C250	1-128-004-11	ELECT CHIP	10MF	20%	16V
C251	1-128-004-11	ELECT CHIP	10MF	20%	16V
C252	1-164-222-11	CERAMIC CHIP	0.22MF		25V
C253	1-164-005-11	CERAMIC CHIP	0.47MF		25V
C254	1-128-004-11	ELECT CHIP	10MF	20%	16V
C255	1-128-006-11	ELECT CHIP	4.7MF	20%	25V
C256	1-126-246-11	ELECT CHIP	220MF	20%	4V

Ref.No	Part No.	Description			Remark
C257	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C258	1-128-004-11	ELECT CHIP	10MF	20%	16V
C259	1-163-023-00	CERAMIC CHIP	0.015MF		50V
C261	1-124-779-00	ELECT CHIP	10MF	20%	16V
C262	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C263	1-126-207-11	ELECT CHIP	33MF	20%	4V
C264	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C265	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C266	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C267	1-124-779-00	ELECT CHIP	10MF	20%	16V
C268	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C269	1-128-004-11	ELECT CHIP	10MF	20%	16V
C270	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C271	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C273	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C274	1-128-004-11	ELECT CHIP	10MF	20%	16V
C275	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C276	1-128-004-11	ELECT CHIP	10MF	20%	16V
C277	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C278	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C279	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C280	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C284	1-128-004-11	ELECT CHIP	10MF	20%	16V
C285	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C286	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C287	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C288	1-126-416-11	ELECT	220MF	20%	10V
C289	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C301	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C302	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C303	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C305	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C306	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C307	1-128-004-11	ELECT CHIP	10MF	20%	16V
C308	1-162-995-11	CERAMIC CHIP	0.022MF		50V
C309	1-126-192-11	ELECT CHIP	0.68MF	20%	50V
C310	1-128-013-11	ELECT CHIP	1MF	20%	50V
C311	1-128-013-11	ELECT CHIP	1MF	20%	50V
C312	1-162-969-11	CERAMIC CHIP	0.0068MF	10%	25V
C315	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C316	1-128-004-11	ELECT CHIP	10MF	20%	16V
C317	1-128-004-11	ELECT CHIP	10MF	20%	16V
C318	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C319	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C320	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C321	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C322	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C323	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C324	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C325	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C326	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C327	1-162-951-11	CERAMIC CHIP	68PF	5%	50V
C328	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C329	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C330	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C331	1-128-004-11	ELECT CHIP	10MF	20%	16V
C332	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C333	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C334	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C335	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C336	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C337	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C339	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C340	1-162-937-11	CERAMIC CHIP	6PF	0.5PF	50V
C352	1-128-013-11	ELECT CHIP	1MF	20%	50V
C353	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C354	1-128-006-11	ELECT CHIP	4.7MF	20%	25V
C355	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C357	1-128-004-11	ELECT CHIP	10MF	20%	16V
C358	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C359	1-163-118-00	CERAMIC CHIP	110PF	5%	50V
C360	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C361	1-128-007-11	ELECT CHIP	2.2MF	20%	35V
C362	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C363	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C364	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C365	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C366	1-162-936-11	CERAMIC CHIP	5PF	0.25PF	50V
C367	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C368	1-162-943-11	CERAMIC CHIP	15PF	5%	50V
C370	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C371	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C401	1-162-638-11	CERAMIC CHIP	1MF		16V (E/AUS MODEL)
C402	1-126-155-11	ELECT	100MF	20%	6.3V
C403	1-162-638-11	CERAMIC CHIP	1MF		16V
C405	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C406	1-126-207-11	ELECT CHIP	33MF	20%	4V
C407	1-162-638-11	CERAMIC CHIP	1MF		16V (E/AUS MODEL)
C408	1-126-155-11	ELECT	100MF	20%	6.3V
C409	1-162-638-11	CERAMIC CHIP	1MF		16V
C411	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C412	1-135-181-21	TANTAL. CHIP	4.7MF	20%	6.3V
C413	1-162-638-11	CERAMIC CHIP	1MF		16V
C414	1-126-207-11	ELECT CHIP	33MF	20%	4V
C416	1-126-246-11	ELECT CHIP	220MF	20%	4V (E/AUS MODEL)
C417	1-126-207-11	ELECT CHIP	33MF	20%	4V
C418	1-126-207-11	ELECT CHIP	33MF	20%	4V
C419	1-162-638-11	CERAMIC CHIP	1MF		16V
C421	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C423	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C425	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C426	1-162-971-11	CERAMIC CHIP	0.001MF		50V
C429	1-162-971-11	CERAMIC CHIP	0.001MF		50V
C430	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C431	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C432	1-135-181-21	TANTAL. CHIP	4.7MF	20%	6.3V

When indicating parts by reference number, please include the board name.

VA-46P

Ref.No	Part No.	Description			Remark
C435	1-128-006-11	ELECT CHIP 4.7MF	20%	25V	
C436	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C437	1-128-003-11	ELECT CHIP 22MF	20%	4V	
C438	1-128-003-11	ELECT CHIP 22MF	20%	4V	
C440	1-126-205-11	ELECT CHIP 47MF	20%	6.3V	
C442	1-163-809-11	CERAMIC CHIP 0.047MF	10%	25V	
C443	1-126-100-11	ELECT 10MF	20%	6.3V	
C445	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C446	1-126-100-11	ELECT 10MF	20%	6.3V	
C448	1-163-809-11	CERAMIC CHIP 0.047MF	10%	25V	
C449	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C450	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C452	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C454	1-162-638-11	CERAMIC CHIP 1MF		16V	
C455	1-124-778-00	ELECT CHIP 22MF	20%	6.3V	
C457	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C458	1-164-156-11	CERAMIC CHIP 0.1MF		25V	
C459	1-162-971-11	CERAMIC CHIP 0.001MF		50V	
C460	1-128-004-11	ELECT CHIP 10MF	20%	16V	
C461	1-128-004-11	ELECT CHIP 10MF	20%	16V	
C462	1-162-963-11	CERAMIC CHIP 680PF	10%	50V	
C463	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V	
C464	1-128-004-11	ELECT CHIP 10MF	20%	16V	
C465	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C466	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C467	1-162-974-11	CERAMIC CHIP 0.01MF		50V	
C470	1-162-971-11	CERAMIC CHIP 0.001MF		50V	(E/AUS MODEL)
C471	1-162-971-11	CERAMIC CHIP 0.001MF		50V	(E/AUS MODEL)
C472	1-162-971-11	CERAMIC CHIP 0.001MF		50V	
C473	1-162-971-11	CERAMIC CHIP 0.001MF		50V	
C474	1-162-970-11	CERAMIC CHIP 0.01MF	10%	25V	(E/AUS MODEL)
C475	1-162-970-11	CERAMIC CHIP 0.01MF	10%	25V	(E/AUS MODEL)
C476	1-128-013-11	ELECT CHIP 1MF	20%	50V	
C477	1-128-013-11	ELECT CHIP 1MF	20%	50V	

FILTER

CF301	1-577-162-11	FILTER, CERAMIC

CONNECTOR

CN401	*1-566-761-11	PIN, CONNECTOR (PC BOARD) 6P
CN506	1-569-486-11	CONNECTOR, BOARD TO BOARD 16P
CN507	1-569-485-11	CONNECTOR, BOARD TO BOARD 20P
CN508	1-569-478-21	CONNECTOR, FPC 20P
CN601	*1-566-764-11	PIN, CONNECTOR (PC BOARD) 9P
CN703	1-568-359-41	CONNECTOR, BOARD TO BOARD 20P
CN704	1-569-363-21	CONNECTOR, FPC 15P

DIODE

Ref.No	Part No.	Description	Remark
D101	8-719-800-76	DIODE 1SS123	
D202	8-719-941-86	DIODE DAN202U	
D203	8-719-941-86	DIODE DAN202U	
D204	8-719-404-46	DIODE MA110	
D205	8-719-941-86	DIODE DAN202U	
D207	8-719-941-86	DIODE DAN202U	
D208	8-719-941-86	DIODE DAN202U	
D209	8-719-941-86	DIODE DAN202U	
D210	8-719-404-46	DIODE MA110	
D211	8-719-941-86	DIODE DAN202U	
D212	8-719-941-86	DIODE DAN202U	
D214	8-719-940-45	DIODE MA159	
D215	8-719-404-46	DIODE MA110	
D216	8-719-404-46	DIODE MA110	
D351	8-719-404-46	DIODE MA110	
D401	8-719-941-86	DIODE DAN202U	
D406	8-719-404-46	DIODE MA110	
D408	8-719-941-86	DIODE DAN202U	

FILTER

FL201	1-236-751-21	FILTER, LOW PASS
FL202	1-415-764-21	DELAY LINE, LC
FL203	1-236-848-21	FILTER, LOW PASS
FL204	1-415-729-21	DELAY LINE, LC (Y)
FL205	1-236-952-21	L.P.F (CCD PAL (Y))
FL301	1-236-849-21	FILTER, BAND PASS
FL302	1-236-186-11	FILTER, BAND PASS
FL303	1-236-850-21	FILTER, BAND PASS

IC

IC001	8-759-999-02	IC TL1596CDSB
IC101	8-759-012-00	IC MC10H116M
IC201	8-752-036-19	IC CXA1207R
IC202	8-752-335-88	IC CXL1506M
IC203	8-752-036-20	IC CXA1208R
IC204	8-759-605-61	IC CXA1203N
IC205	8-759-710-29	IC NJM2235M
IC206	8-759-322-02	IC HA118070FPTR
IC207	8-759-710-07	IC NJM2234M
IC400	8-741-100-98	IC SBX1506-21
IC401	8-759-103-25	IC UPD4053BG
IC402	8-759-100-94	IC UPC358G2
IC403	8-759-100-94	IC UPC358G2
IC404	8-752-334-42	IC CXD2106Q
IC406	8-759-981-82	IC NJM3414M
IC407	8-759-009-22	IC MC14094BF

COIL

L101	1-412-032-11	INDUCTOR CHIP	100UH
L102	1-412-280-31	INDUCTOR	330UH
L103	1-410-167-41	INDUCTOR CHIP	820UH
L104	1-410-387-11	INDUCTOR CHIP	33UH
L105	1-410-657-21	INDUCTOR CHIP	180UH
L106	1-410-387-11	INDUCTOR CHIP	33UH
L109	1-410-381-11	INDUCTOR CHIP	10UH
L110	1-410-658-31	INDUCTOR CHIP	220UH
L122	1-410-658-31	INDUCTOR CHIP	220UH
L124	1-412-280-31	INDUCTOR	330UH

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L125	1-410-380-31	INDUCTOR CHIP 8.2UH	
L126	1-412-032-11	INDUCTOR CHIP 100UH	
L129	1-412-026-11	INDUCTOR CHIP 1UH	
L171	1-410-392-11	INDUCTOR CHIP 82UH	
L181	1-412-026-11	INDUCTOR CHIP 1UH	
L201	1-410-390-11	INDUCTOR CHIP 56UH	
L202	1-410-391-11	INDUCTOR CHIP 68UH	
L203	1-410-370-31	INDUCTOR CHIP 1.2UH	
L204	1-410-392-11	INDUCTOR CHIP 82UH	
L205	1-412-031-11	INDUCTOR CHIP 47UH	
L206	1-412-031-11	INDUCTOR CHIP 47UH	
L207	1-410-389-31	INDUCTOR CHIP 47UH	
L209	1-412-031-11	INDUCTOR CHIP 47UH	
L210	1-410-393-11	INDUCTOR CHIP 100UH	
L211	1-410-375-11	INDUCTOR CHIP 3.3UH	
L212	1-410-379-21	INDUCTOR CHIP 6.8UH	
L214	1-410-377-31	INDUCTOR CHIP 4.7UH	
L301	1-410-393-11	INDUCTOR CHIP 100UH	
L302	1-410-386-11	INDUCTOR CHIP 27UH	
L304	1-410-393-11	INDUCTOR CHIP 100UH	
L305	1-410-393-11	INDUCTOR CHIP 100UH	
L306	1-410-655-31	INDUCTOR CHIP 120UH	
L307	1-410-656-11	INDUCTOR CHIP 150UH	
L308	1-410-379-21	INDUCTOR CHIP 6.8UH	
L400	1-412-031-11	INDUCTOR CHIP 47UH	
L401	1-412-031-11	INDUCTOR CHIP 47UH	
L402	1-412-031-11	INDUCTOR CHIP 47UH	
		TRANSISTOR	
Q001	8-729-905-23	TRANSISTOR 2SA1576-R	
Q002	8-729-905-35	TRANSISTOR 2SC4081-R	
Q004	8-729-905-35	TRANSISTOR 2SC4081-R	
Q005	8-729-905-35	TRANSISTOR 2SC4081-R	
Q059	8-729-905-18	TRANSISTOR DTC144EU	
Q060	8-729-905-18	TRANSISTOR DTC144EU	
Q061	8-729-905-18	TRANSISTOR DTC144EU	
Q062	8-729-905-18	TRANSISTOR DTC144EU	
Q063	8-729-905-12	TRANSISTOR DTA144EU	
Q101	8-729-905-23	TRANSISTOR 2SA1576-R	
Q102	8-729-905-18	TRANSISTOR DTC144EU	
Q103	8-729-905-23	TRANSISTOR 2SA1576-R	
Q105	8-729-905-35	TRANSISTOR 2SC4081-R	
Q106	8-729-102-07	TRANSISTOR 2SC2223-F13	
Q107	8-729-905-12	TRANSISTOR DTA144EU	
Q109	8-729-905-35	TRANSISTOR 2SC4081-R	
Q110	8-729-905-18	TRANSISTOR DTC144EU	
Q115	8-729-905-35	TRANSISTOR 2SC4081-R	
Q117	8-729-905-35	TRANSISTOR 2SC4081-R	
Q118	8-729-905-23	TRANSISTOR 2SA1576-R	
Q119	8-729-905-35	TRANSISTOR 2SC4081-R	
Q121	8-729-141-48	TRANSISTOR 2SB624-BV345	
Q122	8-729-102-07	TRANSISTOR 2SC2223-F13	
Q123	8-729-905-35	TRANSISTOR 2SC4081-R	

Ref.No	Part No.	Description	Remark
Q140	8-729-905-12	TRANSISTOR DTA144EU	
Q141	8-729-905-35	TRANSISTOR 2SC4081-R	
Q142	8-729-140-73	TRANSISTOR 2SB798-DL	
Q154	8-729-905-35	TRANSISTOR 2SC4081-R	
Q171	8-729-905-35	TRANSISTOR 2SC4081-R	
Q172	8-729-905-35	TRANSISTOR 2SC4081-R	
Q191	8-729-905-35	TRANSISTOR 2SC4081-R	
Q192	8-729-905-18	TRANSISTOR DTC144EU	
Q195	8-729-905-12	TRANSISTOR DTA144EU	
Q196	8-729-905-18	TRANSISTOR DTC144EU	
Q201	8-729-905-35	TRANSISTOR 2SC4081-R	
Q202	8-729-905-12	TRANSISTOR DTA144EU	
Q203	8-729-905-23	TRANSISTOR 2SA1576-R	
Q204	8-729-905-35	TRANSISTOR 2SC4081-R	
Q205	8-729-202-38	TRANSISTOR 2SC3326N	
Q206	8-729-905-35	TRANSISTOR 2SC4081-R	
Q209	8-729-905-18	TRANSISTOR DTC144EU	
Q210	8-729-905-23	TRANSISTOR 2SA1576-R	
Q211	8-729-905-35	TRANSISTOR 2SC4081-R	
Q212	8-729-905-35	TRANSISTOR 2SC4081-R	
Q213	8-729-904-07	TRANSISTOR FMG2	
Q215	8-729-905-23	TRANSISTOR 2SA1576-R	
Q216	8-729-905-18	TRANSISTOR DTC144EU	
Q220	8-729-101-07	TRANSISTOR 2SB798-DL	
Q221	8-729-905-18	TRANSISTOR DTC144EU	
Q222	8-729-905-12	TRANSISTOR DTA144EU	
Q223	8-729-905-35	TRANSISTOR 2SC4081-R	
Q224	8-729-905-35	TRANSISTOR 2SC4081-R	
Q225	8-729-905-12	TRANSISTOR DTA144EU	
Q226	8-729-905-35	TRANSISTOR 2SC4081-R	
Q227	8-729-905-35	TRANSISTOR 2SC4081-R	
Q228	8-729-905-23	TRANSISTOR 2SA1576-R	
Q229	8-729-905-35	TRANSISTOR 2SC4081-R	
Q231	8-729-905-35	TRANSISTOR 2SC4081-R	
Q232	8-729-905-35	TRANSISTOR 2SC4081-R	
Q238	8-729-905-23	TRANSISTOR 2SA1576-R	
Q240	8-729-905-35	TRANSISTOR 2SC4081-R	
Q241	8-729-905-23	TRANSISTOR 2SA1576-R	
Q244	8-729-905-18	TRANSISTOR DTC144EU	
Q245	8-729-905-XX	TRANSISTOR DTC114TU	
Q246	8-729-905-XX	TRANSISTOR DTC114TU	
Q247	8-729-905-XX	TRANSISTOR DTC114TU	
Q248	8-729-905-18	TRANSISTOR DTC144EU	
Q250	8-729-905-35	TRANSISTOR 2SC4081-R	
Q251	8-729-905-18	TRANSISTOR DTC144EU	
Q301	8-729-905-23	TRANSISTOR 2SA1576-R	
Q303	8-729-905-35	TRANSISTOR 2SC4081-R	
Q304	8-729-905-35	TRANSISTOR 2SC4081-R	
Q306	8-729-905-35	TRANSISTOR 2SC4081-R	
Q307	8-729-905-18	TRANSISTOR DTC144EU	
Q308	8-729-905-12	TRANSISTOR DTA144EU	
Q311	8-729-905-35	TRANSISTOR 2SC4081-R	
Q351	8-729-905-35	TRANSISTOR 2SC4081-R	

When indicating parts by reference number, please include the board name.

VA-46P

Ref.No	Part No.	Description	Remark
Q352	8-729-905-35	TRANSISTOR 2SC4081-R	
Q353	8-729-905-35	TRANSISTOR 2SC4081-R	
Q354	8-729-905-35	TRANSISTOR 2SC4081-R	
Q356	8-729-905-18	TRANSISTOR DTC144EU	
Q357	8-729-905-12	TRANSISTOR DTA144EU	
Q358	8-729-905-18	TRANSISTOR DTC144EU	
Q359	8-729-102-08	TRANSISTOR 2SC2223-F14	
Q362	8-729-905-18	TRANSISTOR DTC144EU	
Q400	8-729-907-39	TRANSISTOR IMD2	
Q401	8-729-905-XX	TRANSISTOR DTC114TU	
Q402	8-729-921-58	TRANSISTOR DTA144TU	(E/AUS MODEL)
Q406	8-729-402-81	TRANSISTOR XN4501	
Q407	8-729-907-39	TRANSISTOR IMD2	
Q409	8-729-905-XX	TRANSISTOR DTC114TU	
Q410	8-729-905-XX	TRANSISTOR DTC114TU	
Q411	8-729-216-22	TRANSISTOR 2SA1162	
Q412	8-729-905-18	TRANSISTOR DTC144EU	
Q413	8-729-905-12	TRANSISTOR DTA144EU	
Q414	8-729-905-18	TRANSISTOR DTC144EU	
Q415	8-729-904-07	TRANSISTOR FMG2	
Q417	8-729-905-18	TRANSISTOR DTC144EU	
Q418	8-729-905-XX	TRANSISTOR DTC114TU	
Q419	8-729-905-18	TRANSISTOR DTC144EU	
Q421	8-729-905-35	TRANSISTOR 2SC4081-R	
Q422	8-729-905-35	TRANSISTOR 2SC4081-R	
Q423	8-729-905-18	TRANSISTOR DTC144EU	
Q426	8-729-905-23	TRANSISTOR 2SA1576-R	
Q428	8-729-905-18	TRANSISTOR DTC144EU	
Q429	8-729-905-35	TRANSISTOR 2SC4081-R	
Q430	8-729-905-18	TRANSISTOR DTC144EU	
Q432	8-729-905-18	TRANSISTOR DTC144EU	
Q433	8-729-905-18	TRANSISTOR DTC144EU	
		RESISTOR	
R001	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R002	1-216-842-11	METAL GLAZE 56K 5% 1/16W	
R003	1-216-817-11	METAL GLAZE 470 5% 1/16W	
R004	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R005	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R006	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R007	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R011	1-216-826-11	METAL GLAZE 2.7K 5% 1/16W	
R012	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R020	1-216-818-11	METAL GLAZE 560 5% 1/16W	
R021	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R025	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R031	1-216-824-11	METAL GLAZE 1.8K 5% 1/16W	
R032	1-216-831-11	METAL GLAZE 6.8K 5% 1/16W	
R033	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R034	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R036	1-216-824-11	METAL GLAZE 1.8K 5% 1/16W	
R038	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R041	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R042	1-216-824-11	METAL GLAZE 1.8K 5% 1/16W	
R043	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R044	1-216-837-11	METAL GLAZE 22K 5% 1/16W	
R045	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R047	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R048	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R049	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R050	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R051	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R052	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R053	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R061	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R062	1-216-847-11	METAL GLAZE 150K 5% 1/16W	
R063	1-216-847-11	METAL GLAZE 150K 5% 1/16W	
R065	1-216-817-11	METAL GLAZE 470 5% 1/16W	
R066	1-216-809-11	METAL GLAZE 100 5% 1/16W	
R071	1-216-661-11	METAL CHIP 2.7K 0.50% 1/10W	
R072	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R073	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R074	1-216-809-11	METAL GLAZE 100 5% 1/16W	
R076	1-216-864-11	METAL GLAZE 0 5% 1/16W	(AEP/UK MODEL)
R087	1-216-831-11	METAL GLAZE 6.8K 5% 1/16W	
R089	1-216-838-11	METAL GLAZE 27K 5% 1/16W	
R092	1-216-830-11	METAL GLAZE 5.6K 5% 1/16W	
R093	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W	
R097	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R099	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R101	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R102	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R103	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R104	1-216-811-11	METAL GLAZE 150 5% 1/16W	
R106	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R108	1-216-837-11	METAL GLAZE 22K 5% 1/16W	
R109	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R110	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R111	1-216-819-11	METAL GLAZE 680 5% 1/16W	
R112	1-216-826-11	METAL GLAZE 2.7K 5% 1/16W	
R113	1-216-814-11	METAL GLAZE 270 5% 1/16W	
R114	1-216-834-11	METAL GLAZE 12K 5% 1/16W	
R115	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R116	1-216-817-11	METAL GLAZE 470 5% 1/16W	
R117	1-216-808-11	METAL GLAZE 82 5% 1/16W	
R118	1-216-832-11	METAL GLAZE 8.2K 5% 1/16W	
R119	1-216-823-11	METAL GLAZE 1.5K 5% 1/16W	
R120	1-216-824-11	METAL GLAZE 1.8K 5% 1/16W	
R122	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R124	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R125	1-216-836-11	METAL GLAZE 18K 5% 1/16W	
R126	1-216-836-11	METAL GLAZE 18K 5% 1/16W	
R127	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R128	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R129	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R131	1-216-837-11	METAL GLAZE 22K 5% 1/16W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R132	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R133	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R134	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R138	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R140	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R141	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R142	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R143	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R144	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R146	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R147	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R148	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R149	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R150	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R151	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R152	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R153	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R154	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R155	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R158	1-216-818-11	METAL GLAZE	560	5%	1/16W	
R159	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R160	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R161	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R162	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R163	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R164	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R165	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R166	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R167	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R168	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R170	1-216-826-11	METAL GLAZE	2.7K	5%	1/16W	
R171	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R172	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R173	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R174	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R175	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	
R176	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R178	1-216-818-11	METAL GLAZE	560	5%	1/16W	
R179	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R181	1-216-804-11	METAL GLAZE	39	5%	1/16W	
R182	1-216-804-11	METAL GLAZE	39	5%	1/16W	
R183	1-216-807-11	METAL GLAZE	68	5%	1/16W	
R184	1-216-138-00	METAL GLAZE	3.3	5%	1/8W	
R185	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R186	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R187	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R188	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R191	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R192	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R193	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R196	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R200	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R201	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	

Ref.No	Part No.	Description				Remark
R202	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R203	1-216-810-11	METAL GLAZE	120	5%	1/16W	
R204	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R206	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R208	1-216-816-11	METAL GLAZE	390	5%	1/16W	
R209	1-216-814-11	METAL GLAZE	270	5%	1/16W	
R210	1-216-819-11	METAL GLAZE	680	5%	1/16W	
R211	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	
R212	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R213	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R214	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R215	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R216	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R219	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R220	1-216-810-11	METAL GLAZE	120	5%	1/16W	
R221	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R222	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R225	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R226	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R227	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R228	1-216-842-11	METAL GLAZE	56K	5%	1/16W	
R229	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R230	1-216-838-11	METAL GLAZE	27K	5%	1/16W	
R231	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R232	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R233	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R234	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R235	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R236	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R237	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R238	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R239	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R241	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R242	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R244	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R245	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R246	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R247	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R248	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R249	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R250	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R251	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R252	1-216-853-11	METAL GLAZE	470K	5%	1/16W	
R255	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R256	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R257	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R258	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R259	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R260	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R261	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R262	1-216-832-11	METAL GLAZE	8.2K	5%	1/16W	
R263	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	
R265	1-216-643-11	METAL CHIP	470	0.50%	1/10W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R267	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R268	1-218-708-91	METAL CHIP	4.7K	0.50%	1/16W	
R269	1-218-688-91	METAL CHIP	680	0.50%	1/16W	
R270	1-218-706-91	METAL CHIP	3.9K	0.50%	1/16W	
R272	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R273	1-218-708-91	METAL CHIP	4.7K	0.50%	1/16W	
R274	1-218-704-91	METAL CHIP	3.3K	0.50%	1/16W	
R276	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R278	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R280	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R281	1-216-824-11	METAL GLAZE	1.8K	5%	1/16W	
R282	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R283	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R284	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R285	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R286	1-216-811-11	METAL GLAZE	150	5%	1/16W	
R287	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R288	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R290	1-216-815-11	METAL GLAZE	330	5%	1/16W	
R291	1-216-815-11	METAL GLAZE	330	5%	1/16W	
R292	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R293	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R294	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R295	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R296	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R297	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R298	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R300	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R301	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	
R302	1-216-824-11	METAL GLAZE	1.8K	5%	1/16W	
R303	1-216-834-11	METAL GLAZE	12K	5%	1/16W	
R304	1-216-838-11	METAL GLAZE	27K	5%	1/16W	
R305	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R308	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R309	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R310	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R311	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R312	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R314	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R315	1-216-828-11	METAL GLAZE	3.9K	5%	1/16W	
R316	1-216-699-11	METAL CHIP	100K	0.50%	1/10W	
R318	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R319	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R321	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R322	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R323	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R324	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R325	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R326	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R327	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R328	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R331	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R332	1-216-817-11	METAL GLAZE	470	5%	1/16W	

Ref.No	Part No.	Description				Remark
R333	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R334	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R335	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R339	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R341	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R342	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R343	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R346	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R348	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R349	1-216-816-11	METAL GLAZE	390	5%	1/16W	
R350	1-216-824-11	METAL GLAZE	1.8K	5%	1/16W	
R351	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R352	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R353	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R354	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R355	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R356	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R357	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R358	1-216-699-11	METAL CHIP	100K	0.50%	1/10W	
R359	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R360	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R361	1-216-832-11	METAL GLAZE	8.2K	5%	1/16W	
R362	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R364	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R365	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R366	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R367	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R368	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R369	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R370	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R371	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R372	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R373	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R374	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R375	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R376	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R382	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R392	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R393	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R394	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R395	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R396	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R397	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R398	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R399	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R400	1-216-841-11	METAL GLAZE	47K	5%	1/16W	(E/AUS MODEL)
R401	1-216-826-11	METAL GLAZE	2.7K	5%	1/16W	(E/AUS MODEL)
R402	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R403	1-216-841-11	METAL GLAZE	47K	5%	1/16W	(E/AUS MODEL)
R404	1-216-826-11	METAL GLAZE	2.7K	5%	1/16W	(E/AUS MODEL)
R405	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R406	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R407	1-216-839-11	METAL GLAZE	33K	5%	1/16W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
R409	1-216-831-11	METAL GLAZE 6.8K 5% 1/16W	
R410	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R411	1-216-864-11	METAL GLAZE 0 5% 1/16W	(AEP/UK MODEL)
R412	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R413	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R414	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R415	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R416	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R417	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R418	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R420	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W	
R421	1-216-831-11	METAL GLAZE 6.8K 5% 1/16W	
R422	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R423	1-216-844-11	METAL GLAZE 82K 5% 1/16W	
R425	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R426	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R427	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R428	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R433	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R434	1-216-837-11	METAL GLAZE 22K 5% 1/16W	
R435	1-216-837-11	METAL GLAZE 22K 5% 1/16W	
R440	1-216-805-11	METAL GLAZE 47 5% 1/16W	
R441	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R442	1-216-805-11	METAL GLAZE 47 5% 1/16W	
R443	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R446	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R447	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R448	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R449	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R450	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R451	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R452	1-216-809-11	METAL GLAZE 100 5% 1/16W	
R453	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R454	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R455	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R456	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R457	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R459	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R460	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R461	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R462	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R463	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R454	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R467	1-216-864-11	METAL GLAZE 0 5% 1/16W	(AEP/UK MODEL)
R469	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R470	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R472	1-216-835-11	METAL GLAZE 15K 5% 1/16W	
R473	1-216-814-11	METAL GLAZE 270 5% 1/16W	
R474	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R475	1-216-853-11	METAL GLAZE 470K 5% 1/16W	
R476	1-216-853-11	METAL GLAZE 470K 5% 1/16W	
R477	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R478	1-216-834-11	METAL GLAZE 12K 5% 1/16W	
R479	1-216-834-11	METAL GLAZE 12K 5% 1/16W	
R480	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R483	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R484	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R485	1-216-832-11	METAL GLAZE 8.2K 5% 1/16W	
R486	1-216-832-11	METAL GLAZE 8.2K 5% 1/16W	
R487	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R489	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R492	1-216-809-11	METAL GLAZE 100 5% 1/16W	
R493	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R494	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R495	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R496	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R497	1-216-809-11	METAL GLAZE 100 5% 1/16W	
R498	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R499	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R602	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R603	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R605	1-216-841-11	METAL GLAZE 47K 5% 1/16W	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV101	1-238-086-11	RES, ADJ CERMET 470	
RV201	1-238-091-11	RES, ADJ CERMET 22K	
RV202	1-238-087-11	RES, ADJ CERMET 1K	
RV203	1-238-088-11	RES, ADJ, CERMET 2.2K	
RV204	1-238-087-11	RES, ADJ CERMET 1K	
RV205	1-238-091-11	RES, ADJ CERMET 22K	
RV206	1-238-088-11	RES, ADJ, CERMET 2.2K	
RV207	1-238-089-11	RES, ADJ CERMET 4.7K	
RV210	1-238-088-11	RES, ADJ, CERMET 2.2K	
RV211	1-238-092-11	RES, ADJ CERMET 47K	
RV301	1-238-086-11	RES, ADJ CERMET 470	
RV351	1-238-090-11	RES, ADJ CERMET 10K	
RV353	1-238-087-11	RES, ADJ CERMET 1K	

SWITCH

Ref.No	Part No.	Description	Remark
S201	1-572-275-11	SWITCH, SLIDE (IN/OUT)	(E/AUS MODEL)
S400	1-570-850-11	SWITCH, SLIDE (HiFi SOUND)	

CRYSTAL

Ref.No	Part No.	Description	Remark
X301	1-577-117-21	VIBRATOR, CRYSTAL	

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When indicating parts by reference number, please include the board name.

CT-21P

Ref.No	Part No.	Description		Remark
	*A-7062-308-A	CT-21P BOARD, COMPLETE (Ref.No 1,000 Series) ************************		
	1-633-979-11	FP-299 FLEXIBLE BOARD		
	3-744-842-01	SUPPORT, CT PC BOARD		
	*3-744-949-01	PLATE, SHIELD, CT		

CAPACITOR

Ref.No	Part No.	Description		Remark
C700	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C701	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C702	1-128-020-11	ELECT CHIP 10MF	0	6.3V
C703	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C704	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C706	1-135-177-21	TANTAL. CHIP 1MF	20%	25V
C709	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C710	1-128-020-11	ELECT CHIP 10MF	0	6.3V
C711	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C717	1-128-015-11	ELECT CHIP 22MF	0	4V
C718	1-128-015-11	ELECT CHIP 22MF	0	4V
C720	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C721	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C723	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C724	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C726	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C727	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C728	1-128-020-11	ELECT CHIP 10MF	0	6.3V
C729	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C730	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C734	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C735	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C736	1-162-638-11	CERAMIC CHIP 1MF		16V
C737	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C738	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C739	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C740	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C741	1-162-917-11	CERAMIC CHIP 15PF	5%	50V
C742	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C743	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C744	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C745	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C746	1-164-227-11	CERAMIC CHIP 0.022MF	10%	25V
C747	1-164-227-11	CERAMIC CHIP 0.022MF	10%	25V
C748	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C749	1-135-145-11	TANTAL. CHIP 0.47MF	20%	35V
C750	1-162-923-11	CERAMIC CHIP 47PF	5%	50V
C751	1-135-179-21	TANTAL. CHIP 2.2MF	20%	16V
C752	1-162-970-11	CERAMIC CHIP 0.01MF	10%	25V
C753	1-162-915-11	CERAMIC CHIP 10PF	0.5PF	50V
C754	1-162-958-11	CERAMIC CHIP 270PF	5%	50V
C755	1-162-958-11	CERAMIC CHIP 270PF	5%	50V
C756	1-162-638-11	CERAMIC CHIP 1MF		16V
C757	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C758	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C759	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C760	1-162-916-11	CERAMIC CHIP 12PF	5%	50V
C761	1-162-917-11	CERAMIC CHIP 15PF	5%	50V
C763	1-162-927-11	CERAMIC CHIP 100PF	5%	50V
C769	1-128-049-11	ELECT CHIP 1MF	0	50V
C770	1-131-352-00	ELECT(SOLID) 6.8MF	20%	6.3V
C773	1-163-809-11	CERAMIC CHIP 0.047MF	10%	25V
C774	1-162-965-11	CERAMIC CHIP 0.0015MF	10%	50V
C799	1-135-178-11	TANTAL. CHIP 1.5MF	20%	20V
C901	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C902	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C903	1-162-947-11	CERAMIC CHIP 33PF	5%	50V
C904	1-162-962-11	CERAMIC CHIP 470PF	10%	50V
C905	1-162-997-11	CERAMIC CHIP 10PF	0.5PF	50V
C906	1-163-123-00	CERAMIC CHIP 180PF	5%	50V
C907	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C908	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C909	1-162-970-11	CERAMIC CHIP 0.01MF	10%	25V
C910	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C911	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C930	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C931	1-135-178-11	TANTAL. CHIP 1.5MF	20%	20V

CONNECTOR

Ref.No	Part No.	Description		Remark
CN705	1-568-336-11	CONNECTOR, BOARD TO BOARD 20P		

TRIMMER

Ref.No	Part No.	Description		Remark
CT701	1-141-311-11	CAP, VAR, TRIMMER (CHIP)		
CT702	1-141-331-11	CAP, VAR, TRIMMER (CHIP)		
CT901	1-141-331-11	CAP, VAR, TRIMMER (CHIP)		
CT902	1-141-417-11	CAP, ADJ		

DIODE

Ref.No	Part No.	Description		Remark
D901	8-719-949-46	DIODE 1T32		
D903	8-719-404-46	DIODE MA110		
D904	8-719-404-46	DIODE MA110		
D905	8-719-404-46	DIODE MA110		
D906	8-719-404-46	DIODE MA110		

IC

Ref.No	Part No.	Description		Remark
IC701	8-759-998-30	IC CF79028PG		
IC702	8-752-336-85	IC CXK58257M-10L-T5		
IC703	8-752-039-49	IC CXA1393AN		
IC704	8-759-634-47	IC M51285BGP		
IC707	8-759-710-29	IC NJM2235M		
IC708	8-759-710-86	IC NJM2233BM		
IC709	8-759-710-86	IC NJM2233BM		
IC713	8-759-234-20	IC TC7S08F		
IC901	8-759-970-80	IC MB673198U		
IC902	8-759-151-18	IC UPD6451G		

COIL

Ref.No	Part No.	Description		Remark
L700	1-412-028-11	INDUCTOR CHIP 4.7UH		

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L701	1-410-386-11	INDUCTOR CHIP 27UH	
L702	1-412-028-11	INDUCTOR CHIP 4.7UH	
L703	1-412-028-11	INDUCTOR CHIP 4.7UH	
L704	1-412-032-11	INDUCTOR CHIP 100UH	
L705	1-412-028-11	INDUCTOR CHIP 4.7UH	
L901	1-412-032-11	INDUCTOR CHIP 100UH	
L902	1-412-143-11	MICRO INDUCTOR	
L903	1-412-282-41	INDUCTOR 470UH	
		TRANSISTOR	
Q701	8-729-925-91	TRANSISTOR DTC115EU	
Q702	8-729-907-03	TRANSISTOR FMG5	
Q703	8-729-905-18	TRANSISTOR DTC144EU	
Q704	8-729-905-35	TRANSISTOR 2SC4081-R	
Q705	8-729-905-23	TRANSISTOR 2SA1576-R	
Q706	8-729-905-18	TRANSISTOR DTC144EU	
Q707	8-729-905-35	TRANSISTOR 2SC4081-R	
Q708	8-729-905-15	TRANSISTOR DTC144WU	
Q709	8-729-905-35	TRANSISTOR 2SC4081-R	
Q710	8-729-905-35	TRANSISTOR 2SC4081-R	
Q720	8-729-905-18	TRANSISTOR DTC144EU	
Q726	8-729-905-23	TRANSISTOR 2SA1576-R	
Q727	8-729-905-35	TRANSISTOR 2SC4081-R	
Q728	8-729-905-35	TRANSISTOR 2SC4081-R	
Q729	8-729-905-18	TRANSISTOR DTC144EU	
Q730	8-729-905-12	TRANSISTOR DTA144EU	
Q800	8-729-905-18	TRANSISTOR DTC144EU	
Q801	8-729-905-23	TRANSISTOR 2SA1576-R	
		RESISTOR	
R700	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R702	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R704	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R706	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R708	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R711	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R713	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R715	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R716	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R720	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R722	1-216-817-11	METAL GLAZE 470 5% 1/16W	
R723	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R724	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R725	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R729	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R731	1-216-847-11	METAL GLAZE 150K 5% 1/16W	
R732	1-216-847-11	METAL GLAZE 150K 5% 1/16W	
R734	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R735	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R736	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R737	1-216-841-11	METAL GLAZE 47K 5% 1/16W	
R741	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R742	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R745	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R747	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R748	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R749	1-216-837-11	METAL GLAZE 22K 5% 1/16W	
R750	1-216-838-11	METAL GLAZE 27K 5% 1/16W	
R751	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R753	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R754	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R755	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R757	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R758	1-216-823-11	METAL GLAZE 1.5K 5% 1/16W	
R759	1-216-806-11	METAL GLAZE 56 5% 1/16W	
R760	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R761	1-216-814-11	METAL GLAZE 270 5% 1/16W	
R762	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R763	1-216-843-11	METAL GLAZE 68K 5% 1/16W	
R764	1-216-832-11	METAL GLAZE 8.2K 5% 1/16W	
R766	1-216-857-11	METAL GLAZE 1M 5% 1/16W	
R770	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R772	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R776	1-216-815-11	METAL GLAZE 330 5% 1/16W	
R777	1-216-823-11	METAL GLAZE 1.5K 5% 1/16W	
R780	1-216-830-11	METAL GLAZE 5.6K 5% 1/16W	
R781	1-216-836-11	METAL GLAZE 18K 5% 1/16W	
R782	1-216-828-11	METAL GLAZE 3.9K 5% 1/16W	
R783	1-216-832-11	METAL GLAZE 8.2K 5% 1/16W	
R784	1-216-821-11	METAL GLAZE 1K 5% 1/16W	
R787	1-216-822-11	METAL GLAZE 1.2K 5% 1/16W	
R788	1-216-822-11	METAL GLAZE 1.2K 5% 1/16W	
R789	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R793	1-216-831-11	METAL GLAZE 6.8K 5% 1/16W	
R795	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R796	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W	
R797	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R798	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R901	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R902	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R903	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R904	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	
R905	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R906	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R907	1-216-839-11	METAL GLAZE 33K 5% 1/16W	
R908	1-216-845-11	METAL GLAZE 100K 5% 1/16W	
R909	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R911	1-216-838-11	METAL GLAZE 27K 5% 1/16W	
R912	1-216-864-11	METAL GLAZE 0 5% 1/16W	
R913	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W	
R914	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R915	1-216-830-11	METAL GLAZE 5.6K 5% 1/16W	
R916	1-216-833-11	METAL GLAZE 10K 5% 1/16W	
R917	1-216-842-11	METAL GLAZE 56K 5% 1/16W	
R918	1-216-834-11	METAL GLAZE 12K 5% 1/16W	
R919	1-216-864-11	METAL GLAZE 0 5% 1/16W	

When indicating parts by reference number, please include the board name.

CT-21P | CK-20P | RM-22P | DK-5P

Ref.No	Part No.	Description				Remark
R920	1-216-828-11	METAL GLAZE	3.9K	5%	1/16W	
R921	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R923	1-216-824-11	METAL GLAZE	1.8K	5%	1/16W	
R924	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R925	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R926	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R927	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R930	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R932	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R933	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R934	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R959	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R960	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R961	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R962	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R963	1-216-815-11	METAL GLAZE	330	5%	1/16W	
R964	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R966	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R967	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R968	1-216-814-11	METAL GLAZE	270	5%	1/16W	
R969	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R970	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R976	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R977	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R978	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R979	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R982	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R983	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R984	1-216-809-11	METAL GLAZE	100	5%	1/16W	

VARIABLE RESISTOR

Ref.No	Part No.	Description
RV702	1-238-089-11	RES, ADJ CERMET 4.7K
RV703	1-238-092-11	RES, ADJ CERMET 47K

THERMISTOR

Ref.No	Part No.	Description
TH700	1-800-200-00	THERMISTOR

CRYSTAL

Ref.No	Part No.	Description
X701	1-567-733-11	VIBRATOR, CRYSTAL (14.3MHz)
X703	1-578-690-11	VIBRATOR, CERAMIC (500KHz)

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*A-7052-313-A CK-20P BOARD, COMPLETE (Ref.No 5,000 Series)
****

Ref.No	Part No.	Description
	1-633-985-11	FP-298 FLEXIBLE BOARD
	*3-744-909-01	HOLDER (CK), LCD

CAPACITOR

Ref.No	Part No.	Description		
C670	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C671	1-135-149-21	TANTAL. CHIP 2.2MF	20%	10V

CONNECTOR

Ref.No	Part No.	Description
CN670	1-565-874-11	PIN, CONNECTOR (PC BOARD) 2P

DIODE

Ref.No	Part No.	Description
D671	8-719-404-46	DIODE MA110
D672	8-719-404-46	DIODE MA110

IC

Ref.No	Part No.	Description
IC670	8-759-634-72	IC M34206M2

COIL

Ref.No	Part No.	Description
L670	1-412-026-11	INDUCTOR CHIP 1UH

DISPLAY PANEL

Ref.No	Part No.	Description
ND670	1-809-022-11	DISPLAY PANEL, LIQUID CRYSTAL

RESISTOR

Ref.No	Part No.	Description			
R671	1-216-295-00	METAL GLAZE	0	5%	1/10W
R672	1-216-097-00	METAL GLAZE	100K	5%	1/10W

SWITCH

Ref.No	Part No.	Description
S670	1-570-870-11	SWITCH, SLIDE (AUTO LOCK)
S671	1-572-078-11	SWITCH, TACTILE (SHUTTER)
S672	1-572-078-11	SWITCH, TACTILE (AE)
S673	1-572-078-11	SWITCH, TACTILE (AF ON/OFF)
S674	1-572-078-11	SWITCH, TACTILE (ONE PUSH)
S675	1-572-078-11	SWITCH, TACTILE (BACK LIGHT)
S676	1-572-078-11	SWITCH, TACTILE (AWB)

CRYSTAL

Ref.No	Part No.	Description
X670	1-567-152-00	VIBRATOR, CERAMIC (40MHz)

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*A-7062-310-A RM-22P BOARD, COMPLETE (Ref.No 7,000 Series)
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IC

Ref.No	Part No.	Description
IC960	8-749-921-76	IC GP1U56

WIRE

Ref.No	Part No.	Description
W960	1-575-585-11	WIRE

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*A-7062-312-A DK-5P BOARD, COMPLETE (Ref.No 5,000 Series)
****

Ref.No	Part No.	Description
	1-633-984-11	FP-297 FLEXIBLE BOARD

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
		CAPACITOR				
C950	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C951	1-163-003-11	CERAMIC CHIP	330PF	10%	50V	
C952	1-163-005-11	CERAMIC CHIP	470PF	10%	50V	
		CONNECTOR				
CN950	1-569-478-21	CONNECTOR, FPC 20P				
		IC				
IC950	8-759-145-63	IC UPD7564G-540				
		TRANSISTOR				
Q950	8-729-901-01	TRANSISTOR DTC144EK				
		RESISTOR				
R950	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R951	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R952	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R953	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R954	1-216-035-00	METAL GLAZE	270	5%	1/10W	
R955	1-216-025-00	METAL GLAZE	100	5%	1/10W	
		SWITCH				
S950	1-571-684-11	SWITCH, TACTIL (TITLE 1)				
S951	1-571-684-11	SWITCH, TACTIL (TITLE 2)				
S952	1-571-684-11	SWITCH, TACTIL (COLOR)				
S953	1-571-684-11	SWITCH, TACTIL (MEMO)				
		CRYSTAL				
X950	1-567-884-11	OSCILLATOR, CERAMIC (700KHz)				

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*A-7071-203-A ED-19P BOARD, COMPLETE (Ref.No 5,000 Series)
****

Ref.No	Part No.	Description	Remark
		DIODE	
D920	8-719-941-34	DIODE GL1HD51-TE84L	
		SWITCH	
S920	1-571-684-11	SWITCH, TACTIL (EDITSEARCH -)	
S921	1-571-684-11	SWITCH, TACTIL (EDITSEARCH +)	
		CONNECTOR	
W922	*1-566-095-11	PIN, BOARD TO BOARD 6P	

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*1-634-736-21 ZK-1P BOARD (Ref.No 7,000 Series)
****

Ref.No	Part No.	Description	Remark
		SWITCH	
S680	1-571-684-11	SWITCH, TACTIL (AF MACRO)	
S681	1-571-684-11	SWITCH, TACTIL (FADER)	

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*A-7062-268-A VC-67P BOARD, COMPLETE (Ref.No 1,000 Series)
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*A-7068-180-A MX-12P BOARD, COMPLETE (HIC)

Ref.No	Part No.	Description				Remark
		CAPACITOR				
C302	1-162-974-11	CERAMIC CHIP	0.01MF		50V	
C401	1-164-346-11	CERAMIC CHIP	1MF		16V	
C402	1-164-346-11	CERAMIC CHIP	1MF		16V	
C403	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C404	1-164-346-11	CERAMIC CHIP	1MF		16V	
C406	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C407	1-164-346-11	CERAMIC CHIP	1MF		16V	
C408	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C409	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C410	1-162-974-11	CERAMIC CHIP	0.01MF		50V	
C411	1-124-566-11	ELECT	120MF	20%	6.3V	
C412	1-162-974-11	CERAMIC CHIP	0.01MF		50V	
C413	1-164-346-11	CERAMIC CHIP	1MF		16V	
C414	1-162-917-11	CERAMIC CHIP	15PF	5%	50V	
C415	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C416	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C417	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C419	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C501	1-126-205-11	ELECT CHIP	47MF	20%	6.3V	
C502	1-162-974-11	CERAMIC CHIP	0.01MF		50V	
C503	1-164-346-11	CERAMIC CHIP	1MF		16V	
C506	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C507	1-162-974-11	CERAMIC CHIP	0.01MF		50V	
C508	1-135-072-21	TANTAL. CHIP	0.22MF	20%	35V	
C509	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	
C510	1-128-004-11	ELECT CHIP	10MF	20%	16V	
C511	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V	
C512	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V	
C513	1-135-180-21	TANTAL. CHIP	3.3MF	20%	6.3V	
C514	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C517	1-135-181-21	TANTAL. CHIP	4.7MF	20%	6.3V	
C518	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C519	1-164-156-11	CERAMIC CHIP	0.1MF		25V	
C520	1-135-071-21	TANTAL. CHIP	0.15MF	10%	35V	
C521	1-135-177-21	TANTAL. CHIP	1MF	20%	20V	
C651	1-126-217-11	ELECT CHIP	15MF	20%	10V	
C654	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	
C655	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	
C656	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description		Remark
C657	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C658	1-128-004-11	ELECT CHIP 10MF	20%	16V
C659	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C660	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C661	1-164-005-11	CERAMIC CHIP 0.47MF		25V
C662	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C663	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C664	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C665	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C666	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C667	1-164-156-11	CERAMIC CHIP 0.1MF		25V
		CONNECTOR		
CN301	1-568-338-11	CONNECTOR, BOARD TO BOARD 24P		
CN302	1-568-331-11	CONNECTOR, BOARD TO BOARD 10P		
CN303	1-566-533-11	CONNECTOR, FPC (ZIF) 17P		
CN304	1-565-877-11	PIN, CONNECTOR (PC BOARD) 5P		
CN305	1-566-528-21	CONNECTOR, FPC (ZIF) 12P		
CN306	1-565-528-21	PIN, CONNECTOR (PC BOARD) 3P		
CN307	*1-565-876-11	PIN, CONNECTOR (PC BOARD) 4P		
CN308	*1-565-541-11	PIN, CONNECTOR (PC BOARD) 2P		
CN651	*1-566-187-11	PIN, CONNECTOR (PC BOARD) 8P		
CN652	1-565-527-11	PIN, CONNECTOR (PC BOARD) 2P		
CN653	1-565-527-11	PIN, CONNECTOR (PC BOARD) 2P		
CN654	*1-565-529-21	PIN, CONNECTOR (PC BOARD) 4P		
CN655	1-565-530-11	PIN, CONNECTOR (PC BOARD) 5P		
		DIODE		
D501	8-719-404-46	DIODE MA110		
D502	8-719-404-46	DIODE MA110		
D503	8-719-404-46	DIODE MA110		
D504	8-719-404-46	DIODE MA110		
		FILTER		
FL301	1-236-759-21	FILTER, LOW PASS (TRAP)		
FL302	1-415-731-21	DELAY LINE, LC (YH)		
FL303	1-415-732-21	DELAY LINE, LC (200NS)		
FL401	1-415-730-21	DELAY LINE, LC (100NS)		
		IC		
IC301	8-759-946-00	IC MB88341PFV		
IC401	8-752-038-XX	IC CXA1392R		
IC501	8-759-037-58	IC MC68HC11E9FUSC400217		
IC502	8-759-008-95	IC MC14028BF		
IC504	8-759-946-00	IC MB88341PFV		
IC505	8-759-998-96	IC LM324DR		
IC507	8-759-030-74	IC SC14S66F		
IC508	8-759-937-56	IC S-8054ALB-LM-S		
IC509	8-759-932-54	IC MC14066BF		
IC510	8-759-998-96	IC LM324DR		
IC651	8-759-981-82	IC RC3414M		
IC652	8-759-037-20	IC MPC1737M		
IC653	8-759-998-98	IC LM358DR		

Ref.No	Part No.	Description				Remark
IC655	8-759-009-07	IC MC14053BF				
IC656	8-759-998-96	IC LM324DR				
		COIL				
L401	1-410-391-11	INDUCTOR CHIP 68UH				
L502	1-412-058-11	INDUCTOR CHIP 10UH				
L503	1-412-062-11	INDUCTOR CHIP 47UH				
		TRANSISTOR				
Q301	8-729-905-23	TRANSISTOR 2SA1576-R				
Q302	8-729-905-23	TRANSISTOR 2SA1576-R				
Q303	8-729-402-84	TRANSISTOR XN4601				
Q401	8-729-402-84	TRANSISTOR XN4601				
Q402	8-729-402-84	TRANSISTOR XN4601				
Q403	8-729-905-23	TRANSISTOR 2SA1576-R				
Q404	8-729-905-35	TRANSISTOR 2SC4081-R				
Q501	8-729-420-50	TRANSISTOR UN5215				
Q502	8-729-420-50	TRANSISTOR UN5215				
Q503	8-729-420-50	TRANSISTOR UN5215				
Q504	8-729-403-10	TRANSISTOR XN6215				
Q505	8-729-403-10	TRANSISTOR XN6215				
Q506	8-729-420-07	TRANSISTOR XN6213				
Q507	8-729-420-50	TRANSISTOR UN5215				
Q508	8-729-402-78	TRANSISTOR XN6401				
Q509	8-729-403-10	TRANSISTOR XN6215				
Q510	8-729-905-35	TRANSISTOR 2SC4081-R				
Q513	8-729-402-84	TRANSISTOR XN4601				
Q514	8-729-905-35	TRANSISTOR 2SC4081-R				
Q515	8-729-402-84	TRANSISTOR XN4601				
Q516	8-729-905-35	TRANSISTOR 2SC4081-R				
Q517	8-729-905-23	TRANSISTOR 2SA1576-R				
Q651	8-729-905-23	TRANSISTOR 2SA1576-R				
Q652	8-729-402-42	TRANSISTOR UN5213				
Q653	8-729-903-48	TRANSISTOR 2SB1132-R				
Q654	8-729-905-35	TRANSISTOR 2SC4081-R				
Q655	8-729-905-35	TRANSISTOR 2SC4081-R				
Q656	8-729-905-35	TRANSISTOR 2SC4081-R				
Q657	8-729-402-84	TRANSISTOR XN4601				
Q658	8-729-402-84	TRANSISTOR XN4601				
		RESISTOR				
R302	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R304	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R307	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R310	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R311	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R312	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R313	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R314	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R315	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R316	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R317	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R318	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R321	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R322	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R325	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R327	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R328	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R329	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R402	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R406	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R407	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R410	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R414	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R415	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R416	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R417	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R418	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R419	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R420	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R421	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R422	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R427	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R428	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R429	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R432	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R435	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R437	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R440	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R501	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R502	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R503	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R504	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R506	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R508	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R509	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R510	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R511	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R513	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R514	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R515	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R517	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R518	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R519	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R520	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R521	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R522	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R523	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R524	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R525	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R526	1-216-847-11	METAL GLAZE	150K	5%	1/16W	
R527	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R528	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R529	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R530	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R531	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R532	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R533	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R534	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R535	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R536	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R537	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R546	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R547	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R550	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R551	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R552	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R553	1-216-685-11	METAL CHIP	27K	0.50%	1/10W	
R554	1-216-842-11	METAL GLAZE	56K	5%	1/16W	
R555	1-216-336-11	METAL GLAZE	47K	1%	1/10W	
R556	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R557	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R560	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R562	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R649	1-216-309-00	METAL GLAZE	5.6	5%	1/10W	
R650	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R652	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R653	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R654	1-216-843-11	METAL GLAZE	68K	5%	1/16W	
R655	1-216-834-11	METAL GLAZE	12K	5%	1/16W	
R656	1-216-134-00	METAL GLAZE	2.2	5%	1/8W	
R657	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R658	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R659	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R660	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R661	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R662	1-216-815-11	METAL GLAZE	330	5%	1/16W	
R663	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R664	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R665	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R666	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R667	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R668	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R669	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R670	1-216-807-11	METAL GLAZE	68	5%	1/16W	
R671	1-216-848-11	METAL GLAZE	180K	5%	1/16W	
R672	1-216-848-11	METAL GLAZE	180K	5%	1/16W	
R673	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R674	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R675	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R676	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R677	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R679	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R680	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R681	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R682	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R683	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R684	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R685	1-216-847-11	METAL GLAZE	150K	5%	1/16W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R686	1-216-830-11	METAL GLAZE	5.6K	5%	1/16W	
R687	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R688	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R689	1-216-843-11	METAL GLAZE	68K	5%	1/16W	
R690	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R691	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R692	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R694	1-216-847-11	METAL GLAZE	150K	5%	1/16W	
R695	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R698	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R699	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R700	1-216-857-11	METAL GLAZE	1M	5%	1/16W	

CRYSTAL

X501	1-578-689-21	VIBRATOR

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*A-7062-270-A CD-20P BOARD, COMPLETE (Ref.No 1,000 Series)
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A-7068-173-A DT-77P BOARD, COMPLETE (HIC)

1-633-975-11 FP-268 FLEXIBLE BOARD
3-744-718-01 HOLDER (10), C

CAPACITOR

C101	1-126-200-11	ELECT CHIP	10MF	20%	35V
C102	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C104	1-128-013-11	ELECT CHIP	1MF	20%	50V
C105	1-126-607-11	ELECT CHIP	47MF	20%	4V
C107	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C110	1-126-206-11	ELECT CHIP	100MF	20%	6.3V
C111	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C112	1-164-005-11	CERAMIC CHIP	0.47MF		25V
C113	1-128-013-11	ELECT CHIP	1MF	20%	50V
C114	1-128-008-11	ELECT CHIP	3.3MF	20%	35V
C115	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C121	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C122	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C123	1-135-177-21	TANTAL. CHIP	1MF	20%	20V
C124	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C125	1-126-205-11	ELECT CHIP	47MF	20%	6.3V
C126	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C127	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C128	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C129	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V
C130	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C131	1-162-638-11	CERAMIC CHIP	1MF		16V
C135	1-162-638-11	CERAMIC CHIP	1MF		16V
C136	1-162-974-11	CERAMIC CHIP	0.01MF		50V
C137	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C138	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C140	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V

Ref.No	Part No.	Description			Remark
C141	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C142	1-135-145-11	TANTAL. CHIP	0.47MF	20%	35V
C144	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C147	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C187	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V
C188	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V
C189	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V
C190	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C191	1-135-181-21	TANTAL. CHIP	4.7MF	20%	6.3V
C192	1-126-100-11	ELECT	10MF	20%	6.3V

CONNECTOR

CN101	*1-565-876-11	PIN, CONNECTOR (PC BOARD) 4P

TRIMMER

CT121	1-141-331-11	CAP, VAR, TRIMMER (CHIP)
CT122	1-141-356-11	CAP, VAR, TRIMMER (CHIP)

DIODE

D101	8-719-404-46	DIODE MA110
D102	8-719-404-52	DIODE MA143
D122	8-719-404-46	DIODE MA110
D123	8-719-404-46	DIODE MA110
D124	8-719-404-32	DIODE MA141WA
D125	8-719-949-46	DIODE 1T32
D127	8-719-404-46	DIODE MA110
D128	8-719-404-46	DIODE MA110

IC

IC121	8-752-326-08	IC CXD1159Q

COIL

L101	1-412-063-21	INDUCTOR CHIP	68UH
L121	1-412-058-11	INDUCTOR CHIP	10UH
L122	1-412-058-11	INDUCTOR CHIP	10UH
L123	1-410-381-11	INDUCTOR CHIP	10UH
L182	1-412-058-11	INDUCTOR CHIP	10UH
L183	1-412-052-21	INDUCTOR CHIP	1UH
L184	1-412-058-11	INDUCTOR CHIP	10UH

TRANSISTOR

Q101	8-765-420-02	TRANSISTOR 2SK300-3
Q102	8-729-905-35	TRANSISTOR 2SC4081-R
Q121	8-729-402-84	TRANSISTOR XN4601
Q122	8-729-402-78	TRANSISTOR XN6401
Q123	8-729-402-19	TRANSISTOR XN6501
Q125	8-729-905-35	TRANSISTOR 2SC4081-R
Q126	8-729-402-84	TRANSISTOR XN4601
Q127	8-729-402-84	TRANSISTOR XN4601
Q129	8-729-905-23	TRANSISTOR 2SA1576-R
Q130	8-729-905-35	TRANSISTOR 2SC4081-R
Q131	8-729-402-84	TRANSISTOR XN4601

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
Q132	8-729-402-84	TRANSISTOR XN4601				
Q133	8-729-402-84	TRANSISTOR XN4601				
Q135	8-729-402-84	TRANSISTOR XN4601				
Q136	8-729-402-45	TRANSISTOR UN5212				
Q137	8-729-402-84	TRANSISTOR XN4601				
		RESISTOR				
R101	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R102	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R103	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R104	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R105	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R108	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R110	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R111	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R112	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R113	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R114	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R115	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R116	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R117	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R118	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R119	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R120	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R121	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R122	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R124	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R125	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R126	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R127	1-216-820-11	METAL GLAZE	820	5%	1/16W	
R128	1-216-843-11	METAL GLAZE	68K	5%	1/16W	
R129	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R130	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R131	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R132	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R133	1-216-850-11	METAL GLAZE	270K	5%	1/16W	
R136	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R138	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R139	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R140	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R141	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R142	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R143	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R144	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R145	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R148	1-216-849-11	METAL GLAZE	220K	5%	1/16W	
R149	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R154	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R155	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R156	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R157	1-216-843-11	METAL GLAZE	68K	5%	1/16W	
R158	1-216-862-11	METAL GLAZE	2.7M	5%	1/16W	
R159	1-216-809-11	METAL GLAZE	100	5%	1/16W	

Ref.No	Part No.	Description				Remark
R160	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R162	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R163	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R164	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R165	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R166	1-216-836-11	METAL GLAZE	18K	5%	1/16W	
R167	1-216-822-11	METAL GLAZE	1.2K	5%	1/16W	
R168	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R169	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R171	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R172	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R173	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R181	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R182	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R183	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R184	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R185	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R186	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R187	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R188	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R189	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R190	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R191	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R192	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R193	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R194	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R195	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R196	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R197	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R198	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R199	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R200	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R201	1-216-671-11	METAL CHIP	6.8K	0.50%	1/10W	
R202	1-216-643-11	METAL CHIP	470	0.50%	1/10W	
R203	1-216-681-11	METAL CHIP	18K	0.50%	1/10W	
R204	1-216-671-11	METAL CHIP	6.8K	0.50%	1/10W	
R205	1-216-659-11	METAL CHIP	2.2K	0.50%	1/10W	
R206	1-216-681-11	METAL CHIP	18K	0.50%	1/10W	
R207	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R208	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R209	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R210	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R215	1-216-842-11	METAL GLAZE	56K	5%	1/16W	
R216	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R217	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R218	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R219	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R220	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R221	1-216-840-11	METAL GLAZE	39K	5%	1/16W	
R222	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R226	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R229	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R230	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

When indicating parts by reference number, please include the board name.

CD-20P AF-54P

Ref.No	Part No.	Description				Remark
R233	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R234	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R235	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R236	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

CRYSTAL

X121	1-579-076-11	VIBRATOR, CRYSTAL
X122	1-567-733-11	VIBRATOR, CRYSTAL

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*A-7062-271-A AF-54P BOARD, COMPLETE (Ref.No 3,000 Series)
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1-633-974-11 FP-267 FLEXIBLE BOARD

CAPACITOR

C801	1-163-059-00	CERAMIC CHIP 0.01MF		50V
C802	1-163-059-00	CERAMIC CHIP 0.01MF		50V
C803	1-163-059-00	CERAMIC CHIP 0.01MF		50V
C804	1-164-346-11	CERAMIC CHIP 1MF		16V
C805	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C806	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C807	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V
C808	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C810	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C811	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V
C812	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V
C813	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V
C814	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V
C815	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C816	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C817	1-164-346-11	CERAMIC CHIP 1MF		16V
C818	1-164-346-11	CERAMIC CHIP 1MF		16V
C819	1-135-177-21	TANTAL. CHIP 1MF	20%	20V
C820	1-164-346-11	CERAMIC CHIP 1MF		16V
C821	1-162-974-11	CERAMIC CHIP 0.01MF		50V
C822	1-162-952-11	CERAMIC CHIP 82PF	5%	50V
C823	1-162-954-11	CERAMIC CHIP 120PF	5%	50V
C824	1-164-346-11	CERAMIC CHIP 1MF		16V
C825	1-162-957-11	CERAMIC CHIP 220PF	5%	50V
C826	1-162-957-11	CERAMIC CHIP 220PF	5%	50V
C827	1-162-957-11	CERAMIC CHIP 220PF	5%	50V
C829	1-164-346-11	CERAMIC CHIP 1MF		16V
C831	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C832	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C833	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C834	1-135-180-21	TANTAL. CHIP 3.3MF	20%	6.3V
C835	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C837	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C839	1-135-177-21	TANTAL. CHIP 1MF	20%	20V

CONNECTOR

CN801	*1-565-529-21	PIN, CONNECTOR (PC BOARD) 4P

Ref.No	Part No.	Description	Remark

DIODE

D801	8-719-404-46	DIODE MA110

FILTER

FL851	1-236-209-11	FILTER, LOW PASS
FL852	1-236-209-11	FILTER, LOW PASS

IC

IC801	8-752-334-83	IC CXD1205R
IC802	8-759-148-87	IC CXA8016M
IC803	8-752-335-65	IC CXD1172AM
IC804	8-759-998-96	IC LM324DR
IC805	8-759-998-96	IC LM324DR

COIL

L801	1-410-655-31	INDUCTOR CHIP 120UH

TRANSISTOR

Q801	8-729-905-35	TRANSISTOR 2SC4081-R
Q802	8-729-905-35	TRANSISTOR 2SC4081-R
Q806	8-729-905-35	TRANSISTOR 2SC4081-R
Q807	8-729-905-35	TRANSISTOR 2SC4081-R
Q808	8-729-905-35	TRANSISTOR 2SC4081-R
Q809	8-729-402-45	TRANSISTOR UN5212

CAPACITOR

R801	1-216-679-11	METAL CHIP	15K	0.50%	1/10W
R802	1-216-679-11	METAL CHIP	15K	0.50%	1/10W
R803	1-216-675-11	METAL CHIP	10K	0.50%	1/10W
R804	1-216-675-11	METAL CHIP	10K	0.50%	1/10W
R805	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R806	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R807	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R808	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R809	1-216-134-00	METAL GLAZE	2.2	5%	1/8W
R810	1-216-144-00	METAL GLAZE	5.6	5%	1/8W
R811	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R816	1-216-864-11	METAL GLAZE	0	5%	1/16W
R819	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R820	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R821	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R822	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R823	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R827	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R828	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R829	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R830	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R831	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R832	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R833	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R834	1-216-821-11	METAL GLAZE	1K	5%	1/16W

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R835	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R836	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R837	1-216-673-11	METAL CHIP	8.2K	0.50%	1/10W	
R838	1-216-691-11	METAL CHIP	47K	0.50%	1/10W	
R839	1-216-673-11	METAL CHIP	8.2K	0.50%	1/10W	
R840	1-216-691-11	METAL CHIP	47K	0.50%	1/10W	
R841	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R842	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R843	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R844	1-216-819-11	METAL GLAZE	680	5%	1/16W	
R845	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R846	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R847	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R848	1-216-828-11	METAL GLAZE	3.9K	5%	1/16W	
R849	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R850	1-216-818-11	METAL GLAZE	560	5%	1/16W	
R851	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R852	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R853	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R854	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R858	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R860	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R862	1-216-679-11	METAL CHIP	15K	0.50%	1/10W	
R863	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R865	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R866	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R867	1-216-635-11	METAL CHIP	220	0.50%	1/10W	
R868	1-216-659-11	METAL CHIP	2.2K	0.50%	1/10W	
R869	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	

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*A-7062-278-A VF-26P BOARD, COMPLETE (Ref.No 8,000 Series)
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1-575-846-11 CONNECTOR, FPC (NON ZIF) 6P

CAPACITOR

Ref.No	Part No.	Description			
C901	1-126-369-11	ELECT	220MF	20%	6.3V
C902	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C904	1-127-515-11	ELECT(SOLID)	47MF	20%	6.3V
C905	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C906	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C907 ⚠	1-162-625-11	CERAMIC CHIP	0.0047MF	5%	50V
C908 ⚠	1-164-182-11	CERAMIC CHIP	0.0033MF	10%	50V
C909	1-126-193-11	ELECT CHIP	1MF	20%	50V
C911	1-131-388-00	TANTALUM	68MF	10%	3.15V
C912	1-102-038-00	CERAMIC	0.001MF		500V
C913	1-163-033-00	CERAMIC CHIP	0.022MF		50V
C915	1-126-193-11	ELECT CHIP	1MF	20%	50V
C916	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C917	1-135-166-21	TANTAL. CHIP	47MF	20%	6.3V
C918	1-162-638-11	CERAMIC CHIP	1MF		16V
C919	1-135-070-00	TANTAL. CHIP	0.1MF	10%	35V
C920	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V

CONNECTOR

Ref.No	Part No.	Description
CN901	*1-566-195-21	PIN, CONNECTOR (PC BOARD) 2P
CN902	*1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P

CONPOSITION CIRCUIT BLOCK

Ref.No	Part No.	Description
CP901	1-238-119-11	RES, ADJ

SOCKET

Ref.No	Part No.	Description
CRT901	1-526-978-21	SOCKET ASSY, CRT

DIODE

Ref.No	Part No.	Description
D903	8-719-400-20	DIODE MA152WA
D955	8-719-404-19	DIODE LN1251C

IC

Ref.No	Part No.	Description
IC901	8-759-420-01	IC AN2512S

COIL

Ref.No	Part No.	Description	
L901	1-410-645-31	INDUCTOR	100UH
L902	1-410-385-11	INDUCTOR CHIP	22UH
L903 ⚠	1-459-858-11	COIL, FERRITE (HLC)	

TRANSISTOR

Ref.No	Part No.	Description
Q903	8-729-106-68	TRANSISTOR 2SD1615
Q904	8-729-216-31	TRANSISTOR 2SA1163G

RESISTOR

Ref.No	Part No.	Description			
R902	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R903	1-216-041-00	METAL GLAZE	470	5%	1/10W
R907	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R908	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R909	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R911	1-216-079-00	METAL GLAZE	18K	5%	1/10W
R914	1-216-133-00	METAL GLAZE	3.3M	5%	1/10W
R915	1-216-133-00	METAL GLAZE	3.3M	5%	1/10W
R916	1-216-125-00	METAL GLAZE	1.5M	5%	1/10W
R917	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R919	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R920	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R921	1-216-013-00	METAL GLAZE	33	5%	1/10W
R922	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R923	1-216-025-00	METAL GLAZE	100	5%	1/10W
R924	1-216-306-11	METAL GLAZE	3.9	5%	1/10W
R925	1-216-336-11	METAL GLAZE	47K	1%	1/10W
R926	1-216-107-00	METAL GLAZE	270K	1%	1/10W
R928	1-216-870-11	METAL GLAZE	180K	1%	1/10W
R929	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R930	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R931	1-216-121-00	METAL GLAZE	1M	5%	1/10W

When indicating parts by reference number, please include the board name.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

VF-26P VF-27P

Ref.No	Part No.	Description	Remark
R950	1-216-041-00	METAL GLAZE 470 5% 1/10W	
R951	1-216-311-00	METAL GLAZE 6.8 5% 1/10W	

VARIABLE RESISTOR

RV901	1-238-647-11	RES, ADJ, METAL GLAZE 4.7M

TRANSFORMER

T901 ⚠	1-439-428-11	TRANSFORMER ASSY, FLYBACK

THERMISTOR

TH901	1-807-938-11	THERMISTOR

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*A-7062-279-A VF-27P BOARD, COMPLETE (Ref.No 9,000 Series)
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1-575-846-11 CONNECTOR, FPC (NON ZIF) 6P

CAPACITOR

C901	1-124-442-00	ELECT	330MF	20%	6.3V
C903	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C904	1-126-160-11	ELECT	1MF	20%	50V
C905	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C906	1-131-381-00	TANTALUM	47MF	10%	6.3V
C907	1-162-638-11	CERAMIC CHIP	1MF		16V
C908	1-136-165-00	FILM	0.1MF	5%	50V
C909	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C910	1-124-587-11	ELECT	220MF	20%	6.3V
C911	1-163-141-00	CERAMIC CHIP	0.001MF	5%	50V
C912 ⚠	1-162-625-11	CERAMIC CHIP	0.0047MF	5%	50V
C913 ⚠	1-162-625-11	CERAMIC CHIP	0.0047MF	5%	50V
C914 ⚠	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V
C915	1-126-090-11	ELECT	82MF	20%	10V
C916	1-126-163-11	ELECT	4.7MF	20%	50V
C918	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C919	1-102-038-00	CERAMIC	0.001MF		500V

CONNECTOR

CN902	*1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P
CN903	*1-566-195-21	PIN, CONNECTOR (PC BOARD) 2P

DIODE

D903	8-719-400-20	DIODE MA152WA
D955	8-719-404-19	DIODE LN1251C

IC

IC901	8-759-420-01	IC AN2512S

COIL

L901	1-410-831-21	INDUCTOR	82UH
L902	1-408-977-21	INDUCTOR	39UH

Ref.No	Part No.	Description	Remark
L903 ⚠	1-459-858-11	COIL, FERRITE (HLC)	

TRANSISTOR

Q903	8-729-216-31	TRANSISTOR 2SA1163G
Q904	8-729-100-66	TRANSISTOR 2SC1623
Q905	8-729-106-68	TRANSISTOR 2SD1615

RESISTOR

R903	1-216-041-00	METAL GLAZE	470	5%	1/10W
R905	1-216-007-00	METAL GLAZE	18	5%	1/10W
R906	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R908	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R909	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R910	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R911	1-216-013-00	METAL GLAZE	33	5%	1/10W
R912	1-216-691-11	METAL CHIP	47K	0.50%	1/10W
R913	1-216-107-00	METAL GLAZE	270K	1%	1/10W
R914	1-216-025-00	METAL GLAZE	100	5%	1/10W
R915	1-216-306-11	METAL GLAZE	3.9	5%	1/10W
R917	1-216-045-00	METAL GLAZE	680	5%	1/10W
R918	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R919	1-216-748-11	METAL GLAZE	39K	5%	1/10W
R920	1-216-748-11	METAL GLAZE	39K	5%	1/10W
R921	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R922	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R923	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R924	1-216-131-11	METAL GLAZE	2.7M	5%	1/10W
R925	1-216-131-11	METAL GLAZE	2.7M	5%	1/10W
R926	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R928	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R933	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R950	1-216-041-00	METAL GLAZE	470	5%	1/10W

VARIABLE RESISTOR

RV901	1-230-873-11	RES, ADJ, METAL GLAZE 47K
RV902	1-230-866-11	RES, ADJ, METAL GLAZE 470
RV903	1-230-869-11	RES, ADJ, METAL GLAZE 4.7K
RV904	1-228-762-00	RES, ADJ, METAL GLAZE 1M

TRANSFORMER

T901 ⚠	1-439-431-11	TRANSFORMER ASSY, FLYBACK

THERMISTOR

TH901	1-807-938-11	THERMISTOR

SOCKET

W901	1-540-019-21	SOCKET ASSY, CRT

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When indicating parts by reference number, please include the board name.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description			Remark
	*A-7062-306-A	SS-100P BOARD, COMPLETE (Ref.No 4,000 Series)			
		*************************			
	1-562-880-11	CONNECTOR, CARD EDGE 15P			
	1-569-346-11	CONNECTOR, FPC (TRANSLATION) 10P			
	1-580-032-11	CONNECTOR, BOARD TO BOARD 2P			
	1-633-923-11	FP-252 FLEXIBLE BOARD			
	1-633-924-11	FP-248 FLEXIBLE BOARD			
	1-633-942-11	FL-26 BOARD			
	3-831-441-11	SPACER			
		CAPACITOR			
C400	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C401	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C402	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C404	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C406	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C407	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C408	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C409	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C411	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C501	1-126-157-11	ELECT	10MF	20%	16V
C502	1-126-160-11	ELECT	1MF	20%	50V
C504	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C505	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C506	1-126-094-11	ELECT	4.7MF	20%	35V
C507	1-164-330-21	CERAMIC CHIP	0.22MF	10%	16V
C508	1-164-330-21	CERAMIC CHIP	0.22MF	10%	16V
C509	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C510	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C511	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C512	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C513	1-128-055-11	ELECT	33MF	20%	10V
C514	1-130-495-00	MYLAR	0.1MF	5%	50V
C515	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C516	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C517	1-162-969-11	CERAMIC CHIP	0.0068MF	10%	25V
C518	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C519	1-164-330-21	CERAMIC CHIP	0.22MF	10%	16V
C520	1-164-330-21	CERAMIC CHIP	0.22MF	10%	16V
C521	1-164-330-21	CERAMIC CHIP	0.22MF	10%	16V
C522	1-162-638-11	CERAMIC CHIP	1MF		16V
C523	1-128-055-11	ELECT	33MF	20%	10V
C524	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C525	1-126-162-11	ELECT	3.3MF	20%	50V
C526	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C527	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C528	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C529	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C530	1-126-157-11	ELECT	10MF	20%	16V
C531	1-126-157-11	ELECT	10MF	20%	16V
C532	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C533	1-162-968-11	CERAMIC CHIP	0.0047MF	10%	50V
C534	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C535	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C536	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C537	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C538	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C539	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C540	1-162-965-11	CERAMIC CHIP	0.0015MF	10%	50V
C541	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C542	1-164-247-11	CERAMIC CHIP	0.047MF	10%	16V
C543	1-164-247-11	CERAMIC CHIP	0.047MF	10%	16V
C545	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C546	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C547	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C548	1-162-638-11	CERAMIC CHIP	1MF		16V
C549	1-162-638-11	CERAMIC CHIP	1MF		16V
C550	1-162-966-11	CERAMIC CHIP	0.0022MF		50V
C551	1-163-023-00	CERAMIC CHIP	0.015MF		50V
C552	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C553	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C554	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C555	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V
C556	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C557	1-163-081-00	CERAMIC CHIP	0.22MF		25V
C559	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C560	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C561	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C562	1-126-157-11	ELECT	10MF	20%	16V
C563	1-126-157-11	ELECT	10MF	20%	16V
C564	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C565	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C566	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C567	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C568	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C569	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C592	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C609	1-126-805-11	ELECT	33MF	20%	10V
C610	1-124-589-11	ELECT	47MF	20%	16V
C620	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C625	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C700	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C710	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C711	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C720	1-162-967-11	CERAMIC CHIP	0.0033MF	10%	50V
C901	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C902	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C903	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C904	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C905	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C906	1-164-227-11	CERAMIC CHIP	0.022MF	10%	25V
C907	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C908	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C909	1-128-055-11	ELECT	33MF	20%	10V
C910	1-128-055-11	ELECT	33MF	20%	10V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C911	1-126-805-11	ELECT 33MF	20%	10V	
C912	1-127-558-11	ELECT(SOLID) 10MF	20%	10V	
C913	1-126-805-11	ELECT 33MF	20%	10V	
C914	1-127-561-11	ELECT(SOLID) 33MF	20%	10V	
C915	1-127-558-11	ELECT(SOLID) 10MF	20%	10V	
C916	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C917	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C918	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V	
C920	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V	
C921	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V	
C922	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V	
C923	1-162-966-11	CERAMIC CHIP 0.0022MF	10%	50V	
C925	1-164-217-11	CERAMIC CHIP 150PF	0.25PF	50V	
C930	1-162-967-11	CERAMIC CHIP 0.0033MF	10%	50V	
C931	1-162-967-11	CERAMIC CHIP 0.0033MF	10%	50V	
C932	1-162-967-11	CERAMIC CHIP 0.0033MF	10%	50V	
C933	1-164-337-11	CERAMIC CHIP 2.2MF		16V	
C934	1-135-211-11	TANTAL. CHIP 6.8MF	20%	6.3V	
C935	1-164-156-11	CERAMIC CHIP 0.1MF		25V	

FILTER

Ref.No	Part No.	Description
FL400	1-236-550-11	BPF
FL401	1-236-551-11	BPF

CONNECTOR

Ref.No	Part No.	Description
CN501	*1-565-211-11	CONNECTOR, FPC (ZIF) 22P
CN502	1-569-364-21	CONNECTOR, FPC 19P
CN503	1-565-878-11	PIN, CONNECTOR (PC BOARD) 6P
CN506	1-569-627-11	CONNECTOR, BOARD TO BOARD 16P
CN507	1-569-626-11	CONNECTOR, BOARD TO BOARD 20P
CN508	1-565-530-11	PIN, CONNECTOR (PC BOARD) 5P
CN509	1-568-207-11	CONNECTOR, FPC (ZIF) 23P

DIODE

Ref.No	Part No.	Description
D501	8-719-941-86	DIODE DAN202U
D506	8-719-941-86	DIODE DAN202U
D510	8-719-404-46	DIODE MA110
D901	8-719-938-75	DIODE SB05-05CP
D902	8-719-938-75	DIODE SB05-05CP
D903	8-719-938-78	DIODE SB10-05PCP

IC

Ref.No	Part No.	Description
IC501	8-752-815-77	IC CXP80116-687Q
IC502	8-759-148-05	IC CXA8010M
IC503	8-759-990-55	IC CXA8006M
IC504	8-759-805-06	IC CXA1127M
IC506	8-752-209-53	IC CXA1204Q
IC507	8-759-030-03	IC LM393M
IC508	8-759-979-38	IC AK93C46
IC901	8-759-500-42	IC MB3783PFV

COIL

Ref.No	Part No.	Description	Remark
L501	1-410-381-11	INDUCTOR CHIP 10UH	
L502	1-410-381-11	INDUCTOR CHIP 10UH	
L503	1-408-795-21	INDUCTOR CHIP 330UH	
L504	1-410-381-11	INDUCTOR CHIP 10UH	
L505	1-410-381-11	INDUCTOR CHIP 10UH	
L515	1-412-028-11	INDUCTOR CHIP 4.7UH	
L901	1-424-104-11	COIL, CHOKE 10UH	
L902	1-424-104-11	COIL, CHOKE 10UH	
L903	1-424-106-11	COIL, CHOKE 47UH	
L904	1-424-106-11	COIL, CHOKE 47UH	
L905	1-424-105-11	COIL, CHOKE 22UH	
L906	1-412-027-11	INDUCTOR CHIP 2.2UH	
L907	1-412-029-11	INDUCTOR CHIP 10UH	
L908	1-412-029-11	INDUCTOR CHIP 10UH	
L909	1-412-029-11	INDUCTOR CHIP 10UH	

IC LINK

Ref.No	Part No.	Description
PS501⚠	1-532-605-00	LINK, IC (ICP-N10 0.4A)

TRANSISTOR

Ref.No	Part No.	Description
Q400	8-729-905-35	TRANSISTOR 2SC4081-R
Q401	8-729-905-35	TRANSISTOR 2SC4081-R
Q402	8-729-905-35	TRANSISTOR 2SC4081-R
Q403	8-729-905-35	TRANSISTOR 2SC4081-R
Q404	8-729-905-35	TRANSISTOR 2SC4081-R
Q502	8-729-905-35	TRANSISTOR 2SC4081-R
Q503	8-729-905-23	TRANSISTOR 2SA1576-R
Q505	8-729-905-35	TRANSISTOR 2SC4081-R
Q506	8-729-905-23	TRANSISTOR 2SA1576-R
Q507	8-729-905-35	TRANSISTOR 2SC4081-R
Q508	8-729-905-23	TRANSISTOR 2SA1576-R
Q509	8-729-905-35	TRANSISTOR 2SC4081-R
Q510	8-729-905-35	TRANSISTOR 2SC4081-R
Q511	8-729-905-23	TRANSISTOR 2SA1576-R
Q512	8-729-907-00	TRANSISTOR DTC114EU
Q513	8-729-905-35	TRANSISTOR 2SC4081-R
Q514	8-729-905-35	TRANSISTOR 2SC4081-R
Q515	8-729-905-18	TRANSISTOR DTC144EU
Q516	8-729-905-18	TRANSISTOR DTC144EU
Q540	8-729-822-48	TRANSISTOR FC101
Q901	8-729-805-25	TRANSISTOR 2SB1121
Q902	8-729-805-25	TRANSISTOR 2SB1121
Q903	8-729-805-25	TRANSISTOR 2SB1121
Q904	8-729-820-46	TRANSISTOR 2SB1202FAT
Q905	8-729-905-35	TRANSISTOR 2SC4081-R

RESISTOR

Ref.No	Part No.	Description			
R400	1-216-837-11	METAL GLAZE	22K	5%	1/16W
R401	1-216-837-11	METAL GLAZE	22K	5%	1/16W
R402	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W
R403	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R404	1-216-821-11	METAL GLAZE	1K	5%	1/16W

When indicating parts by reference number, please include the board name.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
R405	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R406	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R407	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R408	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R409	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R410	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R411	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R412	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R413	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R414	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R415	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R416	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R501	1-216-851-11	METAL GLAZE	330K	5%	1/16W	
R502	1-216-849-11	METAL GLAZE	220K	5%	1/16W	
R503	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R504	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R506	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R507	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R508	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R510	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R511	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R512	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R513	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R514	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R515	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R516	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R517	1-216-851-11	METAL GLAZE	330K	5%	1/16W	
R518	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R519	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R520	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R521	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R522	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R523	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R524	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R525	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R526	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R527	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R528	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R529	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R530	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R531	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R532	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R534	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R535	1-216-843-11	METAL GLAZE	68K	5%	1/16W	
R536	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R537	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R538	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R539	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R540	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R541	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R542	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R543	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R544	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R545	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R546	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R547	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R548	1-217-671-11	METAL GLAZE	1	5%	1/10W	
R549	1-217-671-11	METAL GLAZE	1	5%	1/10W	
R550	1-217-671-11	METAL GLAZE	1	5%	1/10W	
R551	1-217-671-11	METAL GLAZE	1	5%	1/10W	
R552	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R553	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R555	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R556	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R557	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R558	1-216-691-11	METAL CHIP	47K	0.50%	1/10W	
R559	1-216-691-11	METAL CHIP	47K	0.50%	1/10W	
R560	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R561	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R562	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R563	1-216-789-11	METAL GLAZE	2.2	5%	1/16W	
R564	1-216-789-11	METAL GLAZE	2.2	5%	1/16W	
R565	1-216-789-11	METAL GLAZE	2.2	5%	1/16W	
R566	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R567	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R568	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R569	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R571	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R572	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R573	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R574	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R575	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R576	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R577	1-216-811-11	METAL GLAZE	150	5%	1/16W	
R578	1-216-817-11	METAL GLAZE	470	5%	1/16W	
R579	1-216-803-11	METAL GLAZE	33	5%	1/16W	
R582	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R583	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R586	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R587	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R589	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R590	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R591	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R592	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R594	1-216-835-11	METAL GLAZE	15K	5%	1/16W	
R595	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R596	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R597	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R598	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R599	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R600	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R601	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R602	1-216-839-11	METAL GLAZE	33K	5%	1/16W	
R603	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R604	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R605	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R606	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R607	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R608	1-216-854-11	METAL GLAZE	560K	5%	1/16W	
R609	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R610	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R611	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R613	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R614	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R615	1-216-851-11	METAL GLAZE	330K	5%	1/16W	
R616	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R618	1-216-847-11	METAL GLAZE	150K	5%	1/16W	
R619	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R620	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R621	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R622	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R623	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R624	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R625	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R626	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R627	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R628	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R629	1-216-182-00	METAL GLAZE	220	5%	1/8W	
R630	1-216-182-00	METAL GLAZE	220	5%	1/8W	
R631	1-216-815-11	METAL GLAZE	330	5%	1/16W	
R632	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R633	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R635	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R689	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R714	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R715	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R716	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R717	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R719	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R720	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R721	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R722	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R726	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R727	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R728	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R729	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R730	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R735	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R750	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R752	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R754	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R756	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R758	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R761	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R762	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R763	1-216-837-11	METAL GLAZE	22K	5%	1/16W	
R764	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R765	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R800	1-216-864-11	METAL GLAZE	0	5%	1/16W	

Ref.No	Part No.	Description				Remark
R810	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R811	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R812	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R813	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R850	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W	
R851	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R855	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R901	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R902	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R903	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R904	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W	
R905	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R906	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R907	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R908	1-216-166-00	METAL GLAZE	47	5%	1/8W	
R909	1-216-166-00	METAL GLAZE	47	5%	1/8W	
R910	1-216-164-00	METAL GLAZE	39	5%	1/8W	
R911	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R912	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R913	1-216-813-11	METAL GLAZE	220	5%	1/16W	
R914	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R915	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R916	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R924	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R927	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

VARIABLE RESISTOR

RV901	1-238-089-11	RES, ADJ CERMET 4.7K
RV902	1-238-087-11	RES, ADJ CERMET 1K

CRYSTAL

X501	1-577-467-21	VIBRATOR, CRYSTAL (16MHz)
X502	1-567-827-11	VIBRATOR, CRYSTAL

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*A-7062-309-A FU-72P BOARD, COMPLETE (Ref.No 6,000 Series)
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	1-537-281-11	TERMINAL BOARD
	1-633-977-11	FP-293 FLEXIBLE BOARD
	1-633-978-11	FP-295 FLEXIBLE BOARD

CAPACITOR

C503	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C506	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C507	1-135-157-21	TANTAL. CHIP 10MF	20%	6.3V
C508	1-162-964-11	CERAMIC CHIP 0.001MF	10%	50V
C509	1-135-149-21	TANTAL. CHIP 2.2MF	20%	10V
C510	1-164-156-11	CERAMIC CHIP 0.1MF		25V
C511	1-135-149-21	TANTAL. CHIP 2.2MF	20%	10V
C513	1-164-227-11	CERAMIC CHIP 0.022MF	10%	25V
C514	1-162-917-11	CERAMIC CHIP 15PF	5%	50V
C515	1-164-156-11	CERAMIC CHIP 0.1MF		25V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C516	1-135-149-21	TANTAL. CHIP 2.2MF	20%		10V
C517	1-164-156-11	CERAMIC CHIP 0.1MF			25V
C518	1-135-155-21	TANTAL. CHIP 4.7MF	20%		16V
C519	1-164-156-11	CERAMIC CHIP 0.1MF			25V
C520	1-162-967-11	CERAMIC CHIP 0.0033MF	10%		50V
C525	1-162-970-11	CERAMIC CHIP 0.01MF	10%		25V
C994	1-162-966-11	CERAMIC CHIP 0.0022MF			50V
C995	1-126-416-11	ELECT 220MF	20%		10V
		CONNECTOR			
CN502	1-569-480-11	CONNECTOR, FPC 23P			
CN504	1-569-479-21	CONNECTOR, FPC 21P			
CN992	1-565-528-11	PIN, CONNECTOR (PC BOARD) 3P			
		TRIMMER			
CT501	1-141-331-11	CAP, VAR, TRIMMER (CHIP)			
		DIODE			
D501	8-719-938-75	DIODE SB05-05CP-TA			
D502	8-719-404-46	DIODE MA110			
D503	8-719-404-46	DIODE MA110			
D504	8-719-404-46	DIODE MA110			
D505	8-719-404-46	DIODE MA110			
D506	8-719-404-46	DIODE MA110			
D507	8-719-404-46	DIODE MA110			
D510	8-719-812-41	DIODE GL3PR8			
D511	8-719-404-46	DIODE MA110			
		IC			
IC501	8-759-151-42	IC UPD75316GF-071			
IC503	8-759-937-54	IC S-81250HG-RD-S			
IC504	8-759-946-03	IC S-8054ALR-LN-S			
		COIL			
L501	1-412-032-11	INDUCTOR CHIP 100UH			
L502	1-412-031-11	INDUCTOR CHIP 47UH			
L990	1-412-026-11	INDUCTOR CHIP 1UH			
L991	1-410-337-11	INDUCTOR 1UH			
L992	1-410-337-11	INDUCTOR 1UH			
L993	1-410-337-11	INDUCTOR 1UH			
L997	1-412-026-11	INDUCTOR CHIP 1UH			
		IC LINK			
PS990⚠	1-532-841-21	LINK, IC (PRF 1600 1.6A)			
PS991⚠	1-532-840-21	LINK, IC (PRF 1250 1.25A)			
PS992⚠	1-532-840-21	LINK, IC (PRF 1250 1.25A)			
		TRANSISTOR			
Q502	8-729-905-23	TRANSISTOR 2SA1576-R			
Q503	8-729-109-44	TRANSISTOR 2SK94			
Q504	8-729-905-18	TRANSISTOR DTC144EU			
Q505	8-729-905-35	TRANSISTOR 2SC4081-R			
Q506	8-729-402-78	TRANSISTOR XN6401			
Q507	8-729-402-19	TRANSISTOR XN6501			
Q508	8-729-402-78	TRANSISTOR XN6401			
Q509	8-729-904-20	TRANSISTOR FMA2			
Q579	8-729-905-12	TRANSISTOR DTA144EU			
		RESISTOR			
R501	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R502	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R503	1-216-845-11	METAL GLAZE	100K	5%	1/16W
R504	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R505	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R511	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R512	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R513	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R514	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R515	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R516	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R517	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R518	1-216-851-11	METAL GLAZE	330K	5%	1/16W
R519	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R521	1-216-809-11	METAL GLAZE	100	5%	1/16W
R522	1-216-809-11	METAL GLAZE	100	5%	1/16W
R523	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R524	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R525	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R527	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R528	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R529	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R530	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R531	1-216-809-11	METAL GLAZE	100	5%	1/16W
R532	1-216-809-11	METAL GLAZE	100	5%	1/16W
R533	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R534	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R535	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R536	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R537	1-216-817-11	METAL GLAZE	470	5%	1/16W
R538	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R539	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R540	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R541	1-216-841-11	METAL GLAZE	47K	5%	1/16W
R542	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R543	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R544	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R545	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R546	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R547	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R548	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R549	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R550	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R551	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R552	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R553	1-216-843-11	METAL GLAZE	68K	5%	1/16W
R554	1-216-839-11	METAL GLAZE	33K	5%	1/16W

When indicating parts by reference number, please include the board name.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
R555	1-216-861-11	METAL GLAZE	2.2M	5%	1/16W	
R556	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R557	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R558	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R559	1-216-851-11	METAL GLAZE	330K	5%	1/16W	
R560	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R561	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R562	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R563	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R564	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R565	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R566	1-216-855-11	METAL GLAZE	680K	5%	1/16W	
R567	1-216-855-11	METAL GLAZE	680K	5%	1/16W	
R568	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R569	1-216-851-11	METAL GLAZE	330K	5%	1/16W	
R570	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R571	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W	
R572	1-216-809-11	METAL GLAZE	100	5%	1/16W	
R573	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R574	1-216-821-11	METAL GLAZE	1K	5%	1/16W	
R575	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R578	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R579	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R590	1-216-833-11	METAL GLAZE	10K	5%	1/16W	

SWITCH

Ref.No	Part No.	Description
S501	1-571-275-31	SWITCH, SLIDE (REMOTE COMMANDER)
S502	1-572-284-11	SWITCH, SLIDE (EJECT)

CRYSTAL

Ref.No	Part No.	Description
X501	1-527-997-21	VIBRATOR, CRYSTAL (32.8KHz)
X502	1-577-101-11	VIBRATOR, CERAMIC (4.19MHz)

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*A-7062-314-A MC-44P BOARD, COMPLETE (Ref.No 2,000 Series)
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CAPACITOR

Ref.No	Part No.	Description				
C650	1-162-953-11	CERAMIC CHIP	100PF	5%	50V	
C651	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C652	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	
C653	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V	
C655	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V	
C656	1-126-154-11	ELECT	47MF	20%	6.3V	
C657	1-162-963-11	CERAMIC CHIP	680PF	10%	50V	
C659	1-162-638-11	CERAMIC CHIP	1MF		16V	
C661	1-162-953-11	CERAMIC CHIP	100PF	5%	50V	
C662	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C663	1-162-970-11	CERAMIC CHIP	0.01MF	10%	25V	
C665	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V	
C667	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V	
C668	1-126-154-11	ELECT	47MF	20%	6.3V	
C669	1-162-963-11	CERAMIC CHIP	680PF	10%	50V	
C671	1-162-638-11	CERAMIC CHIP	1MF		16V	
C673	1-162-953-11	CERAMIC CHIP	100PF	5%	50V	
C674	1-162-953-11	CERAMIC CHIP	100PF	5%	50V	
C675	1-162-638-11	CERAMIC CHIP	1MF		16V	
C676	1-162-638-11	CERAMIC CHIP	1MF		16V	
C677	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C678	1-126-155-11	ELECT	100MF	20%	6.3V	
C679	1-162-638-11	CERAMIC CHIP	1MF		16V	
C680	1-126-155-11	ELECT	100MF	20%	6.3V	
C681	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C683	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C684	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V	
C685	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V	
C686	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V	
C687	1-162-638-11	CERAMIC CHIP	1MF		16V	

CONNECTOR

Ref.No	Part No.	Description
CN650	*1-565-529-21	PIN, CONNECTOR (PC BOARD) 4P
CN652	1-565-874-11	PIN, CONNECTOR (PC BOARD) 2P

DIODE

Ref.No	Part No.	Description
D652	8-719-106-43	DIODE RD9.1M-B1
D655	8-719-404-46	DIODE MA110

IC

Ref.No	Part No.	Description
IC650	8-759-822-37	IC LA7293M
IC651	8-759-822-37	IC LA7293M

JACK

Ref.No	Part No.	Description
J650	1-507-899-00	JACK (SMALL TYPE) (MIC (PLAG IN POWER))
J651	1-563-454-11	JACK, MINIATURE (DC OUT)

COIL

Ref.No	Part No.	Description
L650	1-410-192-51	INDUCTOR CHIP 1UH
L651	1-410-192-51	INDUCTOR CHIP 1UH
L652	1-410-192-51	INDUCTOR CHIP 1UH
L653	1-410-192-51	INDUCTOR CHIP 1UH
L654	1-410-192-51	INDUCTOR CHIP 1UH

TRANSISTOR

Ref.No	Part No.	Description
Q650	8-729-109-44	TRANSISTOR 2SK94
Q651	8-729-905-35	TRANSISTOR 2SC4081-R
Q653	8-729-905-35	TRANSISTOR 2SC4081-R
Q654	8-729-905-12	TRANSISTOR DTA144EU
Q655	8-729-905-12	TRANSISTOR DTA144EU
Q656	8-729-109-44	TRANSISTOR 2SK94
Q657	8-729-905-35	TRANSISTOR 2SC4081-R
Q658	8-729-904-07	TRANSISTOR FMG2
Q659	8-729-905-35	TRANSISTOR 2SC4081-R

RESISTOR

Ref.No	Part No.	Description			
R650	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W
R651	1-216-818-11	METAL GLAZE	560	5%	1/16W

When indicating parts by reference number, please include the board name.

MC-44P | FP-249 | LI-17P | SW-121P | CC-31P

Ref.No	Part No.	Description				Remark
R652	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R653	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R654	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R655	1-216-826-11	METAL GLAZE	2.7K	5%	1/16W	
R656	1-216-828-11	METAL GLAZE	3.9K	5%	1/16W	
R657	1-216-823-11	METAL GLAZE	1.5K	5%	1/16W	
R658	1-216-818-11	METAL GLAZE	560	5%	1/16W	
R659	1-216-833-11	METAL GLAZE	10K	5%	1/16W	
R660	1-216-844-11	METAL GLAZE	82K	5%	1/16W	
R661	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R662	1-216-826-11	METAL GLAZE	2.7K	5%	1/16W	
R663	1-216-828-11	METAL GLAZE	3.9K	5%	1/16W	
R664	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R667	1-216-831-11	METAL GLAZE	6.8K	5%	1/16W	
R670	1-216-842-11	METAL GLAZE	56K	5%	1/16W	
R671	1-216-842-11	METAL GLAZE	56K	5%	1/16W	
R672	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R673	1-216-845-11	METAL GLAZE	100K	5%	1/16W	
R674	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R678	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R679	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R680	1-216-857-11	METAL GLAZE	1M	5%	1/16W	
R681	1-216-841-11	METAL GLAZE	47K	5%	1/16W	
R682	1-216-864-11	METAL GLAZE	0	5%	1/16W	
R683	1-216-864-11	METAL GLAZE	0	5%	1/16W	

SWITCH

S650	1-553-977-00	SWITCH, SLIDE (BULIT IN MIC)
S651	1-571-787-11	SWITCH, TACTILE (REC START/STOP)

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1-633-922-11 FP-249 FLEXIBLE BOARD
****

1-569-286-11 CONNECTOR, CARD EDGE 5P

****

*1-634-737-21 LI-17P BOARD (Ref.No 7,000 Series)
****

CONNECTOR

CN961	1-565-874-11	PIN, CONNECTOR (PC BOARD) 2P

JACK

J902	1-550-104-11	HOLDER, BATTERY (LITHIUM)

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*A-7071-207-A SW-121P BOARD, COMPLETE (Ref.No 3,000 Series)
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CAPACITOR

C900	1-164-232-11	CERAMIC CHIP 0.01MF	10%	50V

CONNECTOR

CN930	*1-566-761-11	PIN, CONNECTOR (PC BOARD) 6P
CN931	1-575-846-11	CONNECTOR, FPC (NON ZIF) 6P

DIODE

D900	8-719-977-34	DIODE DTZ12
D901	8-719-977-34	DIODE DTZ12
D902	8-719-404-46	DIODE MA110
D903	8-719-977-34	DIODE DTZ12
D904	8-719-977-34	DIODE DTZ12
D905	8-719-404-46	DIODE MA110
D906	8-719-404-46	DIODE MA110
D907	8-719-404-46	DIODE MA110

JACK

J900	1-507-929-11	JACK (REMOTE)
J901	1-565-276-11	JACK, ULTRA SMALL 1P (HEADPHONE)

COIL

L900	1-410-369-11	INDUCTOR CHIP 1UH
L901	1-410-369-11	INDUCTOR CHIP 1UH
L902	1-410-369-11	INDUCTOR CHIP 1UH
L903	1-410-192-51	INDUCTOR CHIP 1UH
L904	1-410-369-11	INDUCTOR CHIP 1UH
L905	1-410-369-11	INDUCTOR CHIP 1UH

TRANSISTOR

Q900	8-729-901-01	TRANSISTOR DTC144EK
Q901	8-729-902-XX	TRANSISTOR DTC114TK

RESISTOR

R900	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R901	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R902	1-216-295-00	METAL GLAZE	0	5%	1/10W

SWITCH

S900	1-570-870-11	SWITCH, SLIDE (STANDBY)
S901	1-571-838-11	SWITCH, TACTIL (START/STOP)

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*1-633-941-21 CC-31P BOARD (Ref.No 2,000 Series)
****

CONNECTOR

CN511	1-569-363-21	CONNECTOR, FPC 15P
CN512	1-566-529-11	CONNECTOR, FPC (ZIF) 13P
CN513	1-566-527-11	CONNECTOR, FPC (ZIF) 11P

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When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
	*1-633-930-21	VK-4P BOARD (Ref.No 7,000 Series)	
		************	
	1-633-981-11	FP-292 FLEXIBLE BOARD	
	1-633-983-11	FP-296 FLEXIBLE BOARD	
		DIODE	
D508	8-719-420-34	DIODE MA151K	
D509	8-719-940-45	DIODE MA159	
		SWITCH	
S500	1-571-787-11	SWITCH, TACTILE (REW)	
S503	1-571-787-11	SWITCH, TACTILE (FF)	
S504	1-571-787-11	SWITCH, TACTILE (STOP)	
S505	1-571-787-11	SWITCH, TACTILE (PAUSE)	
S506	1-571-787-11	SWITCH, TACTILE (TIMA)	
S507	1-571-787-11	SWITCH, TACTILE (DATE)	
S508	1-571-787-11	SWITCH, TACTILE (DS)	
S509	1-571-787-11	SWITCH, TACTILE (EVENT)	
S510	1-572-284-11	SWITCH, SLIDE (REC) (E/AUS MODEL)	
S511	1-570-870-11	SWITCH, SLIDE (SP/LP)	
S512	1-571-787-11	SWITCH, TACTILE (FRAME)	
S513	1-571-787-11	SWITCH, TACTILE (SLOW)	
S514	1-572-283-11	SWITCH, SLIDE (POWER)	
S520	1-571-787-11	SWITCH, TACTILE (PB)	

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MISCELLANEOUS
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Ref.No	Part No.	Description	Remark
	⚠.1-466-230-21	CONVERTER UNIT, D/D	
	1-542-146-11	MICROPHONE, CONDENSER(STEREO)	
	1-547-381-12	FILTER BLOCK, OPTICAL	
	1-547-422-11	LENS, ZOOM (VCL-8508XE)	
	1-569-347-11	CONNECTOR, FPC(TRANSLATION)13P	
	1-572-173-11	SWITCH, SLIDE (ENCODER)	
	1-572-253-11	SWITCH, SLIDE (ENCODER)	
	1-628-060-12	FP-89 FLEXIBLE BOARD	
	1-634-011-11	FP-264 FLEXIBLE BOARD	
	1-808-505-22	SENSOR (DEW)	
	1-809-023-11	DISPLAY PANEL, LIQUID CRYSTAL	
	8-719-979-92	DIODE SPI-315-25-CD	
	8-741-509-11	IC SBX1509-11 (RP-77 BOARD)	
D302	8-719-940-81	DIODE GL452S	
D901	8-719-820-44	PHOTO COUPLER TLP907-0	
D903	8-719-820-44	PHOTO COUPLER TLP907-0	
IC101	※8-752-604-72	IC ICX039AN-2 (CCD IMAGER)	
L901	⚠.1-451-310-21	DEFLECTION YOKE (B/W)	
M902	8-835-331-01	MOTOR, DC U-22A (CAPSTAN)	
M903	A-7040-208-A	MOTOR ASSY, THREADING (LOADING)	
Q301	8-729-906-48	EE-TP109	
Q302	8-729-906-48	EE-TP109	
S302	1-572-298-11	SWITCH, PUSH	
S901	1-572-286-11	SWITCH, PUSH (ZOOM)	
S903	1-571-099-11	SWITCH	
V901-1	⚠1-546-085-11	CATHODE-RAY TUBE, B/W	
V901-2	⚠1-452-482-11	CRT ASSY (M91JYZ60WB)	

****

ACCESSORIES AND PACKING MATERIALS
****

Part No.	Description	Remark
1-465-395-41	COMMANDER, REMOTE (RMT-502)	(E/AUS MODEL)
1-465-395-81	COMMANDER, REMOTE (RMT-502)	(AEP/UK MODEL)
*3-340-514-01	BAG, PROTECTION	
3-701-627-00	BAG, POLYETHYLENE	
*3-744-867-01	CUSHION (UPPER)	
*3-744-868-01	CUSHION (LOWER)	
3-751-687-12	MANUAL, INSTRUCTION (ENGLISH)	(AEP/UK MODEL)
3-751-687-42	MANUAL, INSTRUCTION (FRENCH/GERMAN/SPANISH)	(AEP MODEL)
3-751-687-52	MANUAL, INSTRUCTION (DUTCH/ITALIAN/SWEDISH)	(AEP MODEL)
3-752-301-11	MANUAL, INSTRUCTION (ENGLISH)	(E/AUS MODEL)
3-752-301-41	MANUAL, INSTRUCTION (FRENCH/GERMAN/SPANISH)	(E MODEL)
3-752-301-51	MANUAL, INSTRUCTION (ARABIC)	(E MODEL)
*3-764-631-12	INSTRUCTION, DEW CONDENSATION	

**** ACCESSORIES AND PACKING MATERIALS (KIT) ****

Part No.	Description	Remark
*1-571-164-21	SWITCH, ANTENNA CHANGE (CABLE)	(UK/E MODEL)
3-712-673-01	SCREW DRIVER (UK/E MODEL)	
3-741-582-01	BELT, SHOULDER	
3-744-883-91	INDIVIDUAL CARTON	
*3-741-532-01	CUSHION, ACC	
*3-742-864-01	LID, ACC CUSHION	

	Part No.	Description
**	AC-V35	AC POWER ADAPTOR
***	ANS-89E	SWITCH, ANTENNA CHANGE (UK/E MODEL)
***	NP-66	BATTERY PACK (AEP/UK MODEL)
***	NP-66H	BATTERY PACK (E/AUS MODEL)
***	RFU-89EA	RFU (UK/E MODEL)
***	RFU-90AS	RFU (AUS MODEL)
***	RFU-90E	RFU (AEP MODEL)

Note

** MARK PARTS IS AVAILABLE FOR REPAIR SERVICE.
*** MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.

****

※For replacement of CCD imager, CD-20P board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page93.

When indicating parts by reference number, please include the board name.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Part No.	Description	Remark
	HARDWARE LIST *************	
	SCREW	
7-621-281-15	SCREW +P 2X2	
7-627-555-88	PRECISION SCREW +P 1.4X1.8	
7-627-553-17	PRECISION SCREW +P 2X2 TYPE 3	
7-627-553-37	PRECISION SCREW +P 2X3 TYPE 3	
7-627-553-48	PRECISION SCREW +P 2X4 TYPE 3	
7-627-553-68	PRECISION SCREW +P 2X6 TYPE 3	
	STEEL BALL	
7-671-155-01	STEEL BALL 3.0	

****

9-972-988-11

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Personal Video Group

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CCD-F550E
RMT-502

SONY®
SERVICE MANUAL

AEP Model
UK Model
E Model
Australian Model

SUPPLEMENT-1

- ELECTRICAL ADJUSTMENT
- EXPLODED VIEWS AND PARTS LIST OF ZOOM LENS ASSEMBLY

File this supplement-1 with the service manual.

TABLE OF CONTENTS

Section	Title	Page
1.	**SERVICE MODE**	
1-1.	SENSER LANC	4
1-1-1.	How to Use RM-95 Jig	4
1-1-2.	Transfer Method of the Service Mode with RM-95	5
1-1-3.	SENSER LANC Memory Map	6
1-1-4.	Types of Self-diagnostic Feature	7
1-1-5.	How to Use Practically	8
2.	**MECHANICAL ADJUSTMENTS**	
2-1.	Setting the Track Shift Mode	9
2-2.	Preparation for Adjustment	9
3.	**CAMERA ADJUSTMENTS**	
3-1.	List of Servicing Jigs	10
3-2.	Preparation for Adjustment	12
3-2-1.	Preparation	12
3-2-2.	Caution	13
3-2-3.	Adjustment Remote Control	14
3-2-4.	Checkpoint Array	24
3-2-5.	AF Microcomputer Data Reader Jig	25
3-2-6.	Data Processing	25
3-3.	Adjustment of Camera System	26
3-3-1.	Prime Oscillation Adjustment	26
3-3-2.	PLL Adjustment	26
3-3-3.	Flange Back Adjustment	26
3-3-4.	Camera DC-DC Converter Voltage Check	27
3-3-5.	EVR Initial Setting of Adjustment Page F	27
3-3-6.	PG CONT/V SUB Adjustment	29
3-3-7.	HALL Adjustment	30
3-3-8.	IRIS Adjustment	31
3-3-9.	Shutter IN/OUT Adjustment	31
3-3-10.	Manual Gain Data Adjustment	32
3-3-11.	AGC Adjustment	32
3-3-12.	Matrix Adjustment	33
3-3-13.	Y_H Level Adjustment	34
3-3-14.	Chroma Level Adjustment	35
3-3-15.	Sync Level Adjustment	35
3-3-16.	Setup Adjustment	36
3-3-17.	White Clip Adjustment	36
3-3-18.	Y Level Adjustment	37
3-3-19.	H Aperture Adjustment	37
3-3-20.	Max Gain Adjustment	38
3-3-21.	Burst Level Adjustment	38
3-3-22.	Standard AE Level Adjustment	39
3-3-23.	Iris manual Data Adjustment	39
3-3-24.	Warning Display Level Setting	39
3-3-25.	AE Check	40
3-3-26(A).	Pre-white Balance Adjustment (with Vectorscope)	42
3-3-26(B).	Pre-white Balance Adjustment (with Oscilloscope)	42
3-3-27.	Color Reproducibility Adjustment	42
3-3-28.	Auto White Balance Adjustment	43
3-3-29.	Outdoor White Balance Check	49
3-3-30.	Focus Motor Speed Adjustment	49
3-3-31.	Macro Area Adjustment	50
3-3-32.	Auto Focus Adjusment	50
3-3-33.	Auto Fucus Measuring Distance Check	51
3-3-34.	AF-Zooming Check	51
3-4.	Digital Titler System Adjustment	52
3-4-1.	Chroma Phase/Gain Adjustment	52
3-4-2.	Fader Level Adjustment	52
3-5.	Adjusting Part Location Diagram	54
4.	**ELECTRICAL ADJUSTMENT**	
4-1.	Preparation for Adjustment	57
4-1-1.	Equipment Required	57
4-1-2.	Precaution for Adjustment	57
4-1-3.	Equipment Connection	57
4-1-4.	Setting up for Adjustment	57
4-1-5.	Alignment tape	58
4-1-6.	Input/Output Level and impedance	58
4-1-7.	Service Mode	59
4-2.	Power Voltage Check	64
4-3.	System Control System Adjustment	64
4-3-1.	Battery Down Adjustment	64
4-3-2.	Clock Accuracy Adjustment	65
4-4.	Servo System Adjustment	65
4-4-1.	Switching Position Adjustment	65
4-4-2.	Oscillation Frequency Adjustment	66
4-4-3.	Output Voltage Adjustment	66
4-5.	Video Adjustment	66
4-5-1.	Playback Frequency Characteristic Adjustment	67
4-5-2.	X'tal Oscillator fo Check	67
4-5-3.	REC E-E Level Adjustment	68
4-5-4.	IR Adjustment	68
4-5-5.	Chroma Comb Filter Adjustment	69
4-5-6.	Emphasis Y Level Adjustment	69
4-5-7.	Y FM Carrier Frequency Adjustment	69
4-5-8.	Y FM Deviation Adjustment	70
4-5-9.	REC Y FM Level Adjustment	70
4-5-10.	Chroma Emphasis Adjustment	70
4-5-11.	HUE Phase Deviation Adjustment	71
4-5-12.	REC Chroma Level Adjustment	71
4-5-13.	PB CCD Input Level Adjustment	71
4-5-14.	PB Level Adjustment	72
4-5-15.	4FSC Frequency Adjustment	72
4-5-16.	Controller Frequency Adjustment	72
4-5-17.	Tracking TH Adjustment	73

Section	Title	Page

4-5-18. Character Generator SG Frequency Adjustment 73
4-5-19. DDS Character Position Adjustment 73
4-6. Audio System Adjustment 74
4-6-1. AFM Carrier Frequency Check 74
4-6-2. REC AFM Carrier Level Adjustment 74
4-6-3. Playback Level Check 74
4-6-4. E-E Output Level Check 74
4-6-5. Overall Level Characteristics Check 75
4-6-6. Overall Frequency Characteristics Check 75
4-6-7. Overall Distortion Check 75
4-6-8. Overall Noise Level Check 75
4-7. Electronic Viewfinder System Adjustment (TYPE A) 76
4-7-1. Horizontal Tilt Adjustment 76
4-7-2. Centering Adjustment 76
4-7-3. Foucs Adjustment 76
4-7-4. Aberration Adjustment 77
4-7-5. Horizontal Oscillation Frequency Adjustment 77
4-7-6. Horizontal Amplitude Adjustment 77
4-7-7. Vertical Amplitude Adjustment 78
4-7-8. Brightness, Contrast Adjustments 78
4-7-9. Horizontal Amplitude, Vertical Amplitude and Focus Checks 78
4-8. Electronic Viewfinder System Adjustment (TYPE B) 78
4-8-1. Horizontal Tilt Adjustment 78
4-8-2. Centering Adjustment 79
4-8-3. AFC Adjustment 79
4-8-4. Horizontal Amplitude Adjustment 80
4-8-5. Vertical Amplitude Adjustment 80
4-8-6. Focus Adjustment 80
4-8-7. Brightness, Contrast Adjustments 80
4-9. Adjusting Part Location Diagram 82

5. EXPLODED VIEWS

5-9. Zoom Lens Assembly (1) (VCL-8508XE) 87
5-10. Zoom Lens Assembly (2) (VCL-8508XF) 88

The color reproduction standard frame is contained after the adjustment elements location of camera adjustment parts.

SECTION 1
SERVICE MODE

☆This unit adopts the camera adjustment and the EVR (Electronic Variable resistor) with the SENSER LANC system.

1-1. SENSER LANC

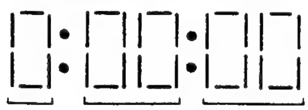
SENSER LANC is the LANC format to adjust the EVR (Electronic Variable resistor) of Video 8 Handycam and to perform tests by using the LANC (control L). This word stands for the same as the SERVICE LANC formerly used, however, the unified word "SENSER LANC" will be used with this substantial functions.

1-1-1. How to Use RM-95 jig (remote control for adjustment)

RM-95 jig is used to operate the SENSER LANC. HOLD switch of this jig is remodelled for service to get the SENSER LANC mode. Replacing microcomputer in RM-95 is required for the old-model RM-95 jig, which has no page display function.

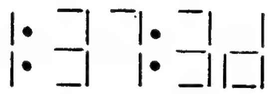
Old model	μPD7503G-A71-12 μPD7503G-C23-12	8-759-142-56 8-759-146-77	Page is not displayed (Replacing microcomputer is required)
New model	μPD7503G-C56-12	8-759-148-35	Page is displayed

LCD display of RM-95



Page Data Address

⇨ Example



This means that the page 1 and address 3D is data of 37.

• Reference between Data and Bit

When the data is 37 ⇨ Bit

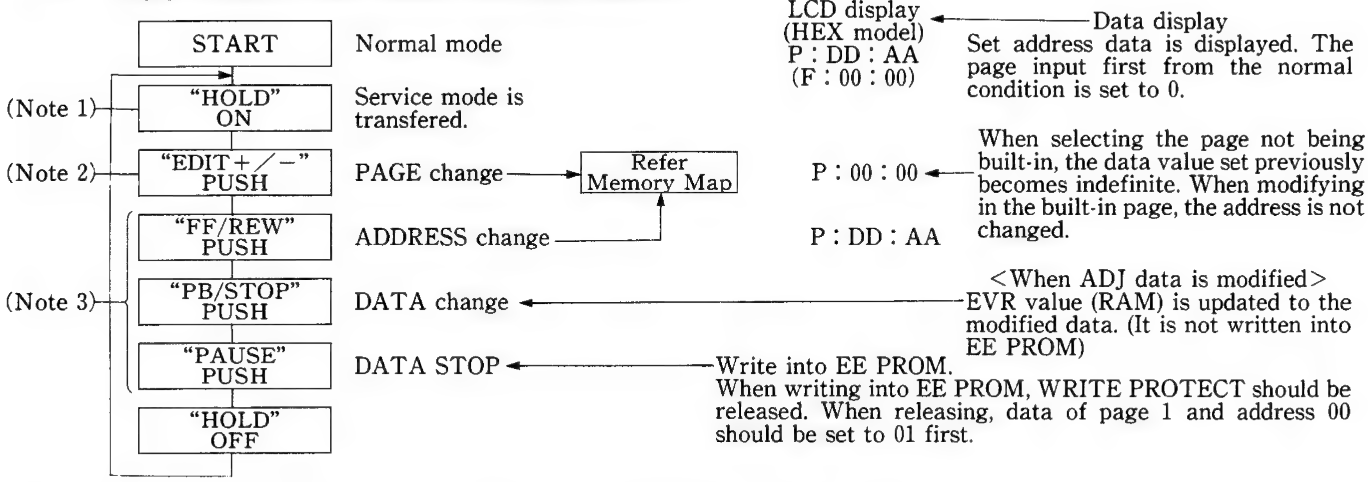
3				7			
7	6	5	4	3	2	1	0
0	0	1	1	0	1	1	1

Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	3D	MP-HG		ME/MP	REC PROOF	V MUTE	A MUTE	JOG	VA PB MODE
		0	0	1	1	0	1	1	1

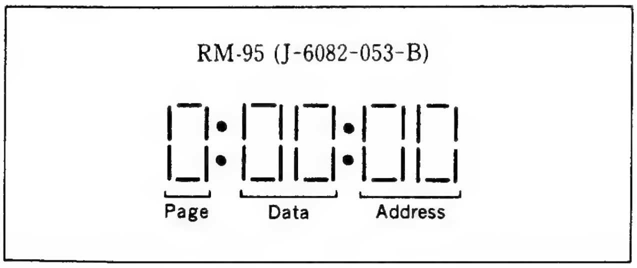
The data in the above list means as follows:

ME SW ....ON
REC PROOF SW ....ON
AUDIO MUTE ......ON
JOG..................ON
VA PB MODE........ON

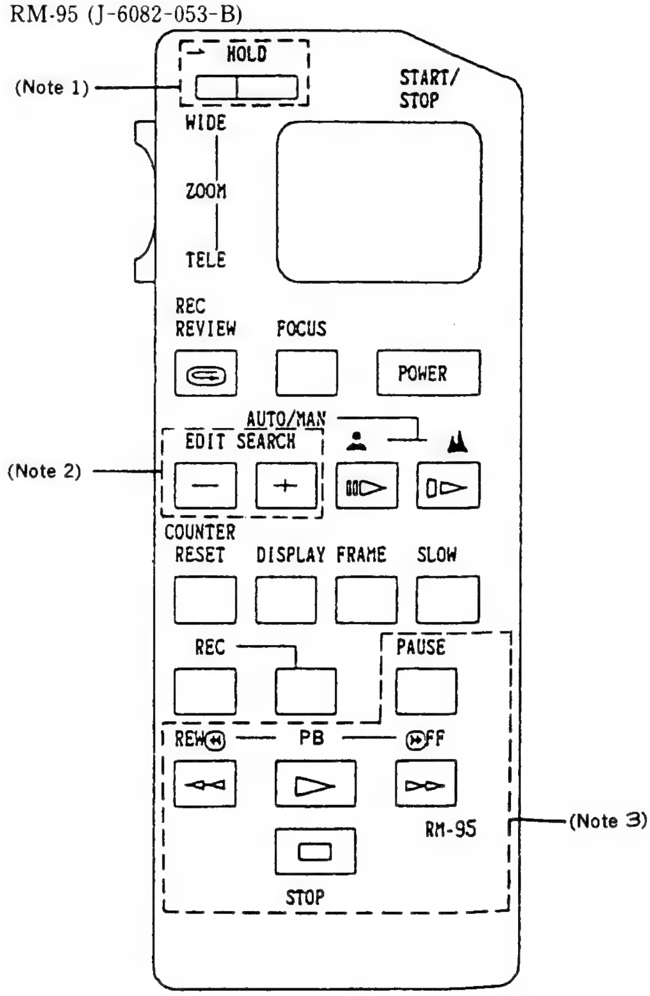
1-1-2. Tansfer method of the service mode with RM-95



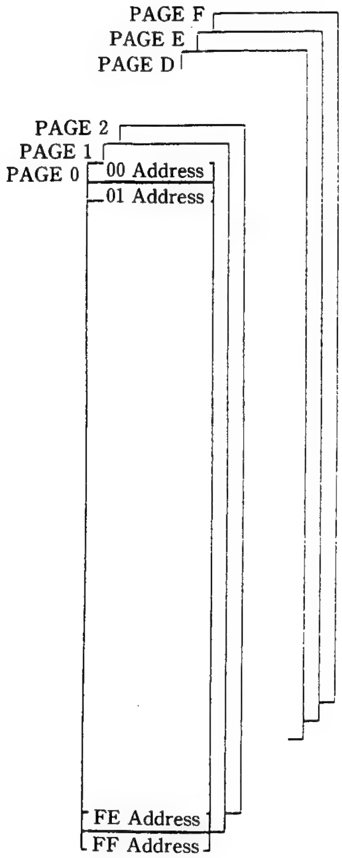
Command name	Command function	Function Button with RM-95
Page Up	Page+1	Edit Search+
Page Down	Page−1	Edit Search−
Direct Page Set	Set to direct page	Event Clear
Address Up	Address+1	Fast Forward
Address Down	Address−1	Rewind
Data Up	Data+1	Play Back
Data Down	Data−1	Stop
Store	Write data into EEPROM. RAM	Pause



RM-95 (J-6082-053-B)



1-1-3. SENSER LANC Memory Map



PAGE	Page allocation	Description
0	Service	
1	Mode Control RAM	RAM and I/O interface data memory area required for operating the mode controller. Data is not held when the power is turned off because this area is not ROM.
2	Mode Control I/O	
3	Mechanical Control RAM	RAM and I/O memory area of the mechanical controller.
4	Mode Control I/O	
5	Camera microcompuler RAM	RAM and I/O memory area of the camera micro controller.
6	Camera microcompuler I/O	
7	Spare	
8	Spare	
9	Spare	
A	Spare	
B	Spare	
C	Spare	
D	VTR EE-PROM	ROM memory area of the VTR part. Data of this area is held by EE-PROM when the power is tuned off. Releasing protect is required for changing data.
E	Camera EE-PROM2	ROM memory area of the camera part. Data of this area is held by EE•P•ROM when the power is tuned off.
F	Camera EE-PROM1	

Note) There are 16 types of page from 0~F. The allocation of page is as the above list. Only the memory of page D, E and F is not erased when the power is turned off as the EVR (Electronic Variable resistor).

1-1-4. Types of Self-diagnostic Feature

This unit has ADJUST mode and TEST mode as follows:

MODE		Contents
ADJUST	Camera adjustment	Refer to Camera Adjustment
	Switching position adjustment	Refer to each adjustment page
	Battery DOWN adjustment	
TEST	Pass adjustment track shift	When adjusting tape pass, set this mode and shift the tracking.
	Emergency STOP inhibition	Detection of emergency is inhibited. This allows the following items. • Power is not turned off when the battery is ended. • SP/LP is not automatically distinguished. • Emergency is not detected except for TOP/END detection of the TAPE.
	Read of emergency code	The following functions are added to the emergency display function currently in use. ①The lithium battery is not required because to memorize into EE-PROM is allowed. ②The first emergency and the last emergency are memorized. ③The mode when the emergency is generated is memorized, in addition to the emergency contents.
	Motor single check	Rotating in right direction, inverting, stopping of each motor can be separately controlled. • Drum motor • Capstan motor • Loading motor
	Function switch check	The acceptance of the function switch of the unit can be confirmed by designating an address. On the contrary, RM-95 can command the substitution for the function switch of the unit.
	Mechanical switch check	The contents of the mechanical switch and the mode switch can be confirmed.
	Sensor check	The following sensor is input by performing A/D selecting, and the A/D selecting value can be confirmed. TOP sensor, End sensor, S REEL FG, T REEL FG, Thermistor for SWP correction, DEW sensor
	Reception contents check of wireless remote control	The received code contents of the remote control code can be confirmed.

1-1-5. How to use practically

How to use:

How to set the adjustment mode and the TEST mode

Set RM-95 to the service mode. (HOLD SW "ON")

How to change and write data

Press the PAUSE button of RM-95. Pressing PAUSE button is not required for some RAM and I/O area.

Change and write data of EE-PROM

Removing PROTECT is required. The PROTECT is removed by setting as follows:

PAGE 1	Address 00	Data 01

But CAMERA system don't need release, because don't set PROTECT.

How to release each mode

Releasing from EE-PROM area	Be sure to return the data of PAGE 1 address 00 to 00 from 01, and then turn off the service mode of RM-95.
Releasing from RAM and I/O area	Turn off the service mode or turn off the power, because hoding of data is not required.

- In order to perform the pass track shift......Refer to page 9.
- In order to inhibit the emergency detection......Refer to the list in page 59.
- In order to check the emergency code......Refer to page 60.
- In order to operate the motor singly......Refer to page 63.
- In order to check the function switch......Refer to page 62.
- In order to check the mechanical switch......Refer to page 61.
- In order to read the A/D selecting value......Refer to page 63.
- In order to check the reception contents of the wireless remote control......Refer to page 63.

SECTION 2
MECHANICAL ADJUSTMENTS

For Mechanical Adjustments

Refer to mechanical adjustment (8 mm Video MECHANICAL ADJUSTMENT MANUAL III) manual for the adjustments and checks of mechanism section and the mechanical parts replacement. (9-972-732-11)
For setting of the track shift mode, however, refer to the following.

2-1. SETTING THE TRACK SHIFT MODE

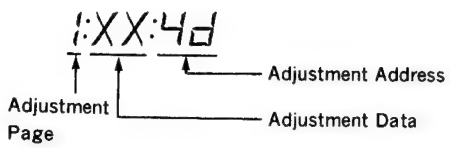
Note : Camera part and video part should have been installed.

[Setting Method]

1) Set the adjustment commander to the HOLD ON side.
2) Press EDIT SEARCH + button once, and select page 1.
3) Select the adjustment address 4D with FF or REW button.
4) Set to 3X with PLAY and STOP button. (Setting of track shift mode)

Note : 3X should be the number from 31 to 3F. (To display "3X" with PLAY and STOP button is simple to shift.)
(When HOLD OFF once after the setting and HOLD ON again, the display of the address data will be changed. To set the another mode with shifting, repeat the procedures from 3).)

5) Set to the HOLD OFF side in order to set the normal mode.



(1X : TEST 1
2X : TEST 2 ('CH Playback)
3X : TEST 3 (Shift mode)
4X : Shift release)

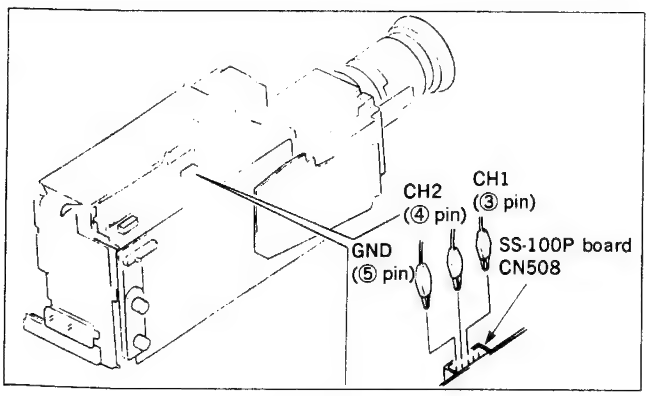


Fig. 2-1.

2-2. PREPARATION FOR ADJUSTMENT

1) Clean the tape running surfaces (tape guide, drum, capstan shaft, pinch roller.)
2) Connect to the oscilloscope.
   CH1 : SS-100P board CN508 pin ③ (PB RF)
   CH2 : SS-100P board CN508 pin ④ (SWP)
3) Play back the tracking alignment tape (WR5-1CP) (8-967-995-07).
4) Check that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. When not flat, make adjustment as follows. (Refer to Figs. 2-1 and 2-2.)

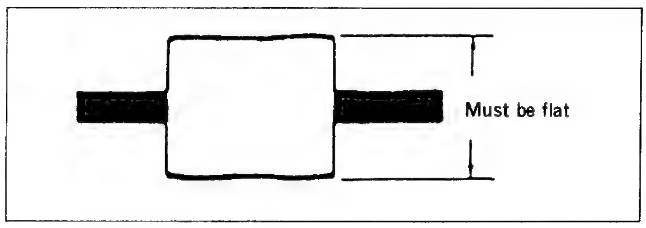


Fig. 2-2.

SECTION 3
CAMERA ADJUSTMENTS

See the adjusting part location diagram from on page 54 for the adjustment.

PREPARATION FOR ADJUSTMENT (CAMERA BLOCK)
3-1. LIST OF SERVICING JIGS

- Oscilloscope
- Stabilized power supply (2 units)
- Adjusting screwdriver
- L lench
- Stop watch
- Color monitor TV
- Vectorscope
- Desk-top calculator

Ref. No.	Name	Part No.	Use
J-1	Filter (C14)	J-6080-054-A	Auto white balance adjustment
J-2	ND filter 0.4	J-6080-806-A	Max gain adjustment, shutter IN/OUT adjustment (2 psc. use)
	ND filter 0.1	J-6080-807-A	Max gain adjustment, shutter IN/OUT adjustment, Auto focus check
	ND filter 1.0	J-6080-808-A	Max gain adjustment (2 pcs. use) Auto focus check
J-3	Pattern box PTB-500	J-6029-140-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Extension cable (5P)	J-6082-043-A	To connect VC-67P board CN304 and DC-DC converter
	Extension cable (4P)	J-6082-042-A	To connect VC-67P board CN307 and VA-46P board W701
J-6	Extension cable (20P)	J-6082-063-B	To connect VA-46P board CN703 and CT-21P board CN705
J-7	Extension cable (12P)	J-6082-056-A	To connect VC-67P board CN305 and VA-46P board W702
J-8	Camera fixing jig	J-6080-894-A	
J-9	Siemens-star	J-6080-875-A	Flange back adjustment
J-10	Adjustment remote control *1	J-6082-053-B	
J-11	AF microcomputer data reader jig *2	J-6082-025-A	

*1 Microcomputer IC in the adjustment Remote controller except for UPD7503G-C56-12 (8-759-148-35) does not allow the page selecting. Replace the microcomputer in such a case.

*2 Change the fixed number of R1 from 10kΩ to 100kΩ in the AF microcomputer data reading jig. (If the number is kept to 10K, the adjustment data can not change because of the difference of of the impedance.)
When adjustment the old-model Handy Cam, 100kΩ is allowed to perform the adustment.

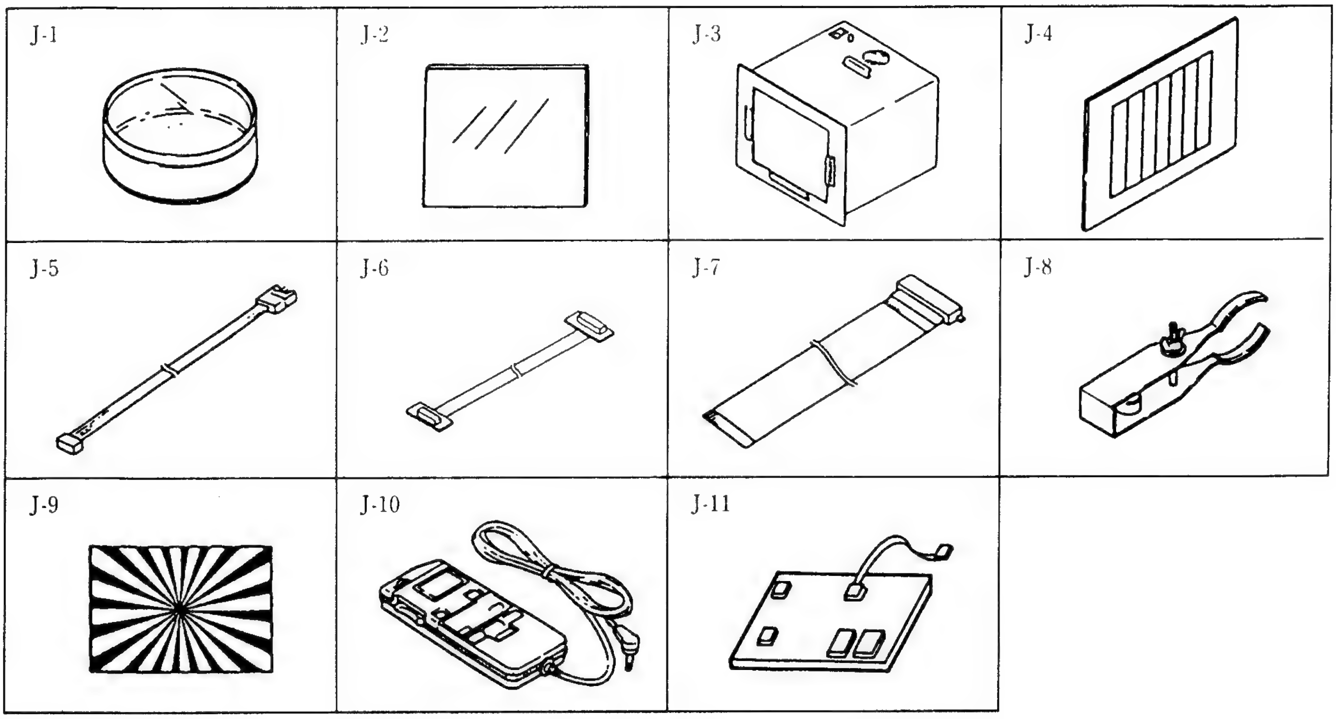


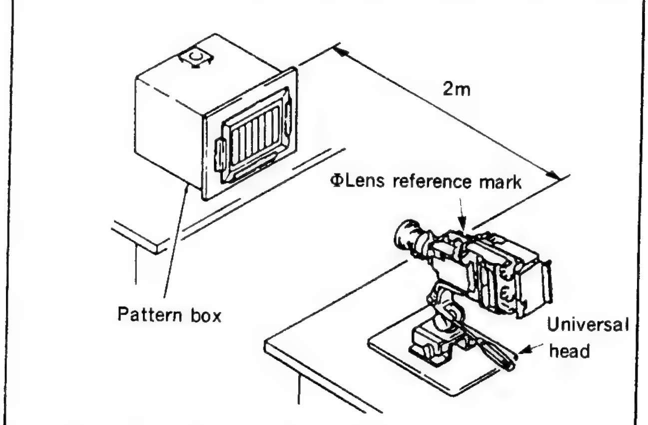
Fig. 3-1.

3-2. PREPARATION FOR ADJUSTMENT

3-2-1. Preparation

Note: Refer to the service manual, "SECTION 2. DISASSEMBLY" for details of the cabinet and individual boards removal procedure.

1) Connect the camera block and the video block by using the extension cable, and other equipment as shown in Fig. 3-3.
2) EVF (Electrical View Finder) section VF-26P or VF-27P boards is necessary for confirmation of shutter speed, white balance mode and etc.
   If not necessary, it can removed by taking out CN931 on the SW-121P board.
3) MIC board (MC-44P board) is not necessary. Remove it by taking out W651 on the MC-44P board.



When the camera block and the video block are separated with the cabinet removed, fix by using the camera fixing jig.

Fig. 3-2.

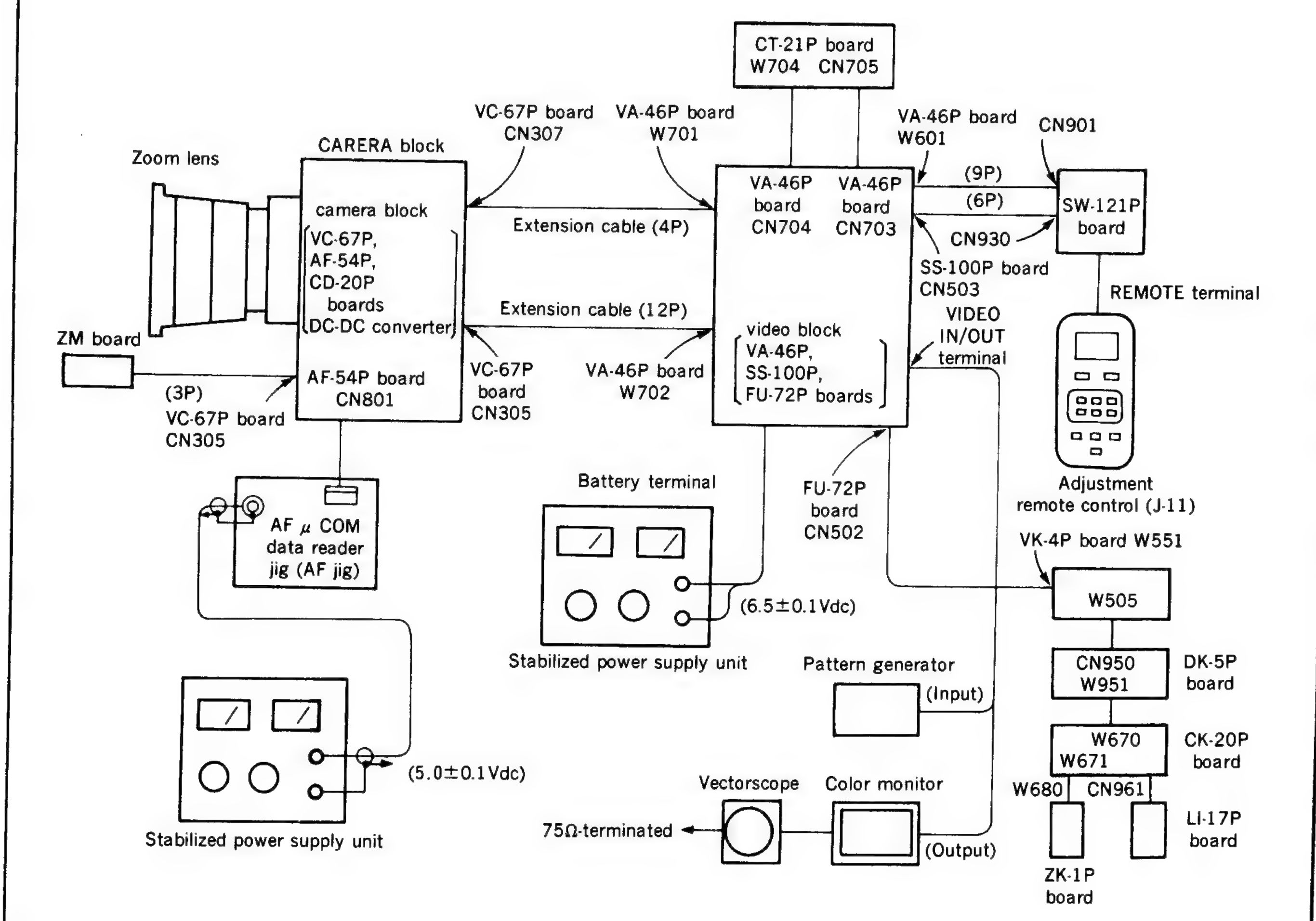


Fig. 3-3.

3-2-2. Caution

1) Setting of switches
Unless otherwise specified, set the switches to the following position for making adjustments.
   1. AUTO LOCK switch
......Lock release position
   2. FOCUS button (S673 on CK-20P board)
......MANUAL mode
   3. WHITE BALANCE button (S676 on CK-20P board)
......INDOOR mode ("INDOOR" indication appears on EVF.)
   4. SHUTTER SPEED button (S671 on CK-20P board)
......NORMAL mode (No indications of "100" "2000", etc. appear on EVF.)

2) Adjustment order
As a rule, adjust in described order.

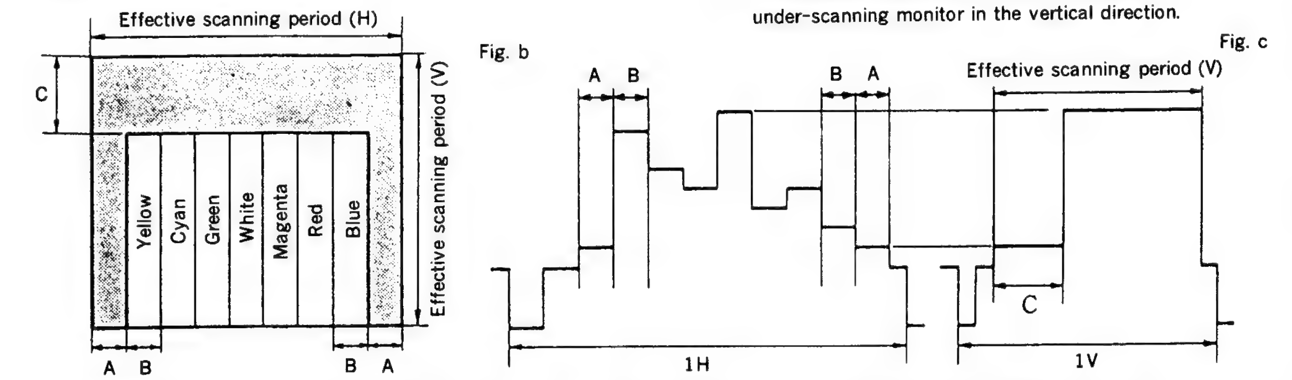
3) Objects
   1. Color bar chart (standard picture frame)
When making Adjustments by the use of a color bar chart, adjust the picture frame as shown in Fig. 3-4. (Standard picture frame)

Color Bar Chart Standard Picture Frame

☆ Basically, adjust the color bar chart standard picture frame with the under-scanning monitor as shown in Fig. a.

1) Place a black window with the horizontal width same as that of a color bar pattern, respectively on left and right sides of the screen. (A=B)
2) Put together lower ends of the color pattern and under-scanning monitor in the vertical direction.

Fig. a

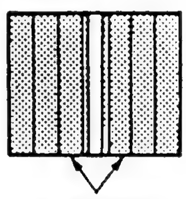


● To photograph the color bar chart standard picture frame shown in Fig. a. adjust Output Y (CN307 ① on VC-67P board) as shown in Fig. b and c.

Fig. 3-4.

   2. All white pattern
Remove a color bar chart from the pattern box and set the zoom lever fully to the TELE side (68mm).
   3. High luminance pattern
Prepare a high luminance pattern as shown in Fig. 3-5 and adjust the picture frame as shown in Fig. 3-6.
   4. Siemens star (J-6080-875-A)
orient a camera to have the siemens star center coincide with the monitor screen center on a monitor TV screen.

High luminance pattern



Cover a color bar chart with black paper, except half the width of its white stripe. Then shoot the chart in this state.

Black paper

Fig. 3-5.

High luminance pattern

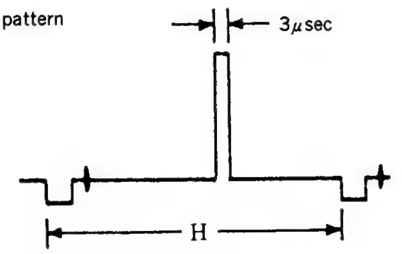


Fig. a (camera output waveform of CPA pin Ⓐ8 on VC-67P board)

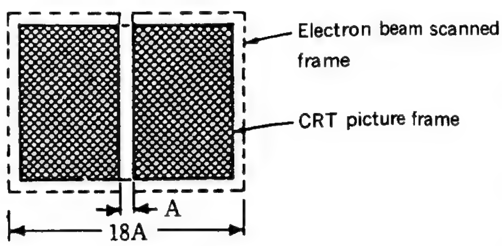


Fig. b (Picture of monitor TV screen)

By operating the camera zooming and orientation have the Fig. a output waveform output and the Fig. b monitor TV image displayed.

Fig. 3-6.

3-2-3. Adjustment Remote Control

In the camera block, the EVR (Electronic Variable Resistor) is used as an adjustment element in place of a conventional semi-fixed resistor. The EVR is controlled by the EVR/AWB microcomputer (VC-67P board IC501). This microcomputer reads the data written in the non-volatile memory inside the microcomputer and sends it to the EVR. The EVR generates an adjustment voltage by D-A conversion of this data (8 bits per one adjustment point).

To adjust, the camera block, therefore, it is necessary to rewrite the adjustment data written in the non-volatile memory. The adjustment remote control is used for this purpose. The adjustment remote control performs bidirectional communications with the microcomputer in the camera block through a remote control signal line (LANC). UP/DOWN commands for adjustment page, address and data are sent from the adjustment remote control to the microcomputer in the camera block. Sent from the microcomputer in the camera block to the adjustment remote control are the adjustment page, address and data.

Note: The microcomputer IC in the adjustment remote controller except for new microcomputer (UPD7503G-C56-12) dose not allow the adjustment page selecting. Replace with the new microcomputer (8-759-148-35) in such a case.

1. Using the Adjustment Remote Control

1) Connect the adjustment remote control to the REMOTE terminal (SW-124P board J901).
(Shift the HOLD switch of the adjustment remote control to the HOLD position (SERVICE position).)
2) Turn on the power for the main unit.
3) If the connection is correct, the following is displayed on the adjustment remote control LCD. (The adjustment data varies from one set to another.)

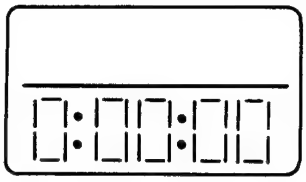


Fig. 3-7. (a)

4) Specify your desired adjustment page by the adjustment remote control.
Pressing the EDIT SEARCH (+) increments the adjustment page. Pressing the EDIT SEARCH (—) decrements it. The adjustment page is shown in the hexadecimal numbers and there are 16 of them from 1 to F. The CAMERA adjustment page is page F and Pressing the EDIT SEARCH (—) buttom one push.

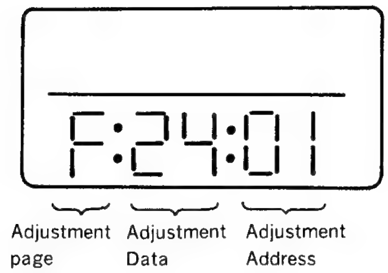


Fig. 3-7. (b)

5) Specify your desired adjustment address by the adjustment remote control. Pressing the FF (▶▶) button increments the adjustment address, and pressing the REW (◀◀) button decrements it.
(The adjustment address is shown in the decimal number and there are 256 of them from 00 to FF. The adjustment address corresponds to the output terminal of the EVR (IC301 on the VC-67P board, IC504 on the VC-67P board, and IC004 of the MX-12P board). Refer to Table 3-3 for adjustment of each address.)
6) Make adjustment by increasing/decreasing the adjustment data.
Pressing the PLAY (▶) button increases the adjustment data, and pressing the STOP (■) button decreases it.

- The adjustment data is shown in the hexadecimal number and assumes 256 kinds of values ranging from 00 to FF.

Hexadecimal No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Indication of LCD	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal converted value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 3-1.

- The adjustment data corresponds to the output voltage of the EVR (IC301 on the VC-67P board, IC504 on the VC-67P board, and IC004 on the MX-12P board) as follows:
  MX-12P board IC004 : 2.0 ⟷ 5.0 Vdc
  VC-67P board IC301 : 0 ⟷ 5.0Vdc
  VC-67P board IC504 : 1.0 ⟷ 3.5Vdc

7) Change the adjustment address with the FF (▶▶) or REW (◀◀) button in order to store the adjustment data into the non-volatile memory built in the EVR/AWB microcomputer (VC-67P board IC501).
(If this operation is omitted, new adjustment data will not be stored into the non-volatile memory.)
8) There is a function provided to make note of the last error cuased by the COUNTER RESET button during operation of the set even if the power is turned off. This LAST MEMO EMERGENCY (last error) can be cleared.

2. Cautions for Using the Adjustment Remote Control

Erroneous operation of the adjustment remote control may delete correct adjustment data. To avoid this, it is recommended to make note of all the adjustment data before adjustment and of new adjustment data every time adjustment of one item is completed.

3. List of Adjustment Addresses

Use the adjustment page F for the camera part adjustment of this unit.

Adjustment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
01	MX-12P board IC004 pin ⑱	R CONT	Auto white balance adjustment	
02	MX-12P board IC004 pin ⑲	B CONT		
03	MX-12P board IC004 pin ②	C_1 GAIN	Matrix (3) C_1 gain adjustment	
04	MX-12P board IC004 pin ③	B GAIN	Pre-white balance adjustment	
05	MX-12P board IC004 pin ④	R GAIN		
06	MX-12P board IC004 pin ⑤	Y_2 GAIN	Matrix adjustment (2) Y_2 gain adjustment	
07	MX-12P board IC004 pin ⑥	Y_1 GAIN	Matrix adjustment (1) Y_1 gain adjustment	
08	MX-12P board IC004 pin ⑦	Y_H GAIN	Y_H level adjustment	
09	MX-12P board IC004 pin ⑧	R-Y GAIN	Color reproducibility adjustment	
0A	MX-12P board IC004 pin ⑨	B-Y GAIN		
0B	MX-12P board IC004 pin ⑫	R-Y HUE		
0C	MX-12P board IC004 pin ⑬	B-Y HUE		
0D	VC-67P board IC301 pin ⑱	SHP LEVEL	H aperture Adjustment	
0E	VC-67P board IC301 pin ⑲	Y LEVEL	White clip, Y level adjustments	
0F	VC-67P board IC301 pin ②	VAP GAIN		
10	VC-67P board IC301 pin ③	SET UP	Set up adjustment	
11	VC-67P board IC301 pin ④	C LEVEL	Chroma level adjustment	
12	VC-67P board IC301 pin ⑤	V SUB CONT	V sub adjustment	
13	VC-67P board IC301 pin ⑥	PG CONT	PG cont adjustment	
14	VC-67P board IC301 pin ⑦	Yr CONT		
15	VC-67P board IC301 pin ⑧	WHITE CLIP	White clip adjustment	
16	VC-67P board IC301 pin ⑨	SYNC LEVEL	Sync level adjustment	
17	VC-67P board IC301 pin ⑫	BURST LEVEL	Burst level adjustment	
18	VC-67P board IC301 pin ⑬	MAX GAIN	Set up, Max gain adjustments	
19	VC-67P board IC504 pin ⑱	IRIS REF	Iris adjustment	
1A	VC-67P board IC504 pin ⑲	AGC REF	AGC adjustment	
1B	VC-67P board IC504 pin ②	HALL GAIN	Hall adjustment	
1C	VC-67P board IC504 pin ③	HALL OFFSET		
1D	VC-67P board IC504 pin ④	FADER LEVEL	Fader level adjustment	
1E	VC-67P board IC504 pin ⑤	————		
1F	VC-67P board IC504 pin ⑥	FADER CONT	Fader level adjustment	
20	VC-67P board IC504 pin ⑦	FOCUS SPEED		
21	VC-67P board IC504 pin ⑧	ZOOM SPEED		
22	VC-67P board IC504 pin ⑨	M IRIS CONT	Not used	
23	VC-67P board IC504 pin ⑫	M AGC CONT		
24	VC-67P board IC504 pin ⑬	AGC IN PULSE		

Table 3-2 (1)

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
25		IN OUT		
26		M12-THR		
27		KATAMUKI		
28		FA-WM		
29		FA-BM	Auto Focus adjustment (1) AF Data Input Preparation	
2A		FH-WM		
2B		FH-BM		
2C		FA-SMH		
2D		FA-SML		
2E		FH-SMH		
2F		FH-SML		
30		LOW-F-SPEED	Focus Motor Speed adjustment	
31		MAN-F-SPEED		
32		STEP-A		
33		END-SENS-V		
34		ZOOM-POSI 1		
35		ZOOM-POSI 2		
36		ZOOM-POSI 3		
37		ZOOM-POSI 4	Macro Aria adjustment	
38		ZOOM-POSI 5		
39		FOCUS-POSI 1		
3A		SEARCH-V		
3B		BACK RUSH 2		
3C		BACK RUSH MODE 3		
3D		ZOOM-TAN-MASK		
3E		ZOOM-END-V		
3F		ZOOM-MODOSI		
40		BACK RUSH-ZOOM		
41		NOT WIDE STOP		
42		MODE 12 NG THR		
43		FA-BASE H-IN		
44		FA-BASE-OUT		
45		AGC-W	Auto Focus adjustment (1) AF Data Input Preparation	
46		AGC-B		

Table 3-2 (2).

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
47		MODE 12 NG LIMIT H		
48		MODE 12 NG LIMIT L		
49		M2 HANTEN		
4A		MODE 5 THR 1		
4B		YOGIRI-IN		
4C		MODE 5 FH FILT		
4D		MODE 5 THR 2 IN		
4E		MODE 5 THR 3		
4F		FH-NG-COUNT		
50		TYUU WAKU		
51		YOGIRI-OUT		
52		MODE 5 THR 20 OUT		
53		AF IRIS IN OUT		
54		MACRO TIME OUT H		
55		MACRO TIME OUT L		
56		MACRO SEARCH		
57		SEISHI		
58		ZOOM-SPEED 1		
59		ZOOM-SPEED 2		
5A		ZOOM-SPEED 3		
5B		ZOOM-SPEED 4		
5C		————		
5D		————		
5E		————		
5F		————		
60		IRIS REF-NOR	Standard AE Level Adjustment	
61		IRIS REF-PO		
62		IRIS REF-SP		
63		IRIS DATA 1	Iris Manual Data Adjustment	
64		GAIN-REF	Manual Gain Data Adjustment	
65		GAIN-MAX		
66		EMG-AGC	Warning Display Level Setting	
67		EMG-AGC-HYS		
68		EMG-AE (H)		
69		EMG-AE (L)		

Table 3-2 (3).

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
6A		EMG-AE-HYS (H)		
6B		MAXSHUT-PO (H)		
6C		MAXSHUT-PO (L)		
6D		MAXSHUT-SP (H)		
6E		MAXSHUT-SP (L)		
6F		REF-WIDTH (H)		
70		REF-WIDTH (L)		
71		SHUT-MULTI (H)		
72		SHUT-MULTI (L)		
73		SHUT-COUNT 1		
74		SHUT STEP-MULTI		
75		IRIS OPEN		
76		REF-TURBO (H)		
77		REF-TURBO (L)		
78		TURBO-WIDTH (H)		
79		TURBO-WIDTH (L)		
7A		TURBO-TR (H)		
7B		TURBO-TR (L)		
7C		SHUT-COUNT 2		
7D		SHUT-COUNT 3		
7E		————	Manual Gain Data Adjustment	
7F		————		
80		USER R-Y GAIN		
81		USER B-Y GAIN		
82		USER B-Y HUE		
83		USER R-Y HUE		
84		USER SHP LEVEL		
85		USER Y LEVEL		
86		————		
87		————		
88		————		
89		————		
8A		————		
8B		————		
8C		————		

Table 3-2 (4).

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
8D		————	AE Check 1. Portrait Mode check	
8E		————	AE Check 2. Sports Mode check	
8F		————	AE Check 3. Iris Preceding check	
90		R3200 MSB		
91		R3200 LSB		
92		R3200 MSB		
93		R3200 LSB		
94		G3200 MSB		
95		G3200 LSB		
96		SHUTTER IN	Shutter IN/OUT adjustment	
97		SHUTTER OUT		
98		START R	Auto white balance adjustment	
99		START B		
9A		R OUT DOOR		
9B		B OUT DOOR		
9C		————		
9D		————		
9E		————		
9F		————		
A0		Ra	Auto white balance adjustment	
A1		Rb		
A2		Rc		
A3		Ba		
A4		Bb		
A5		Bc		
A6		R/B TOP		
A7		R/B MDL		
A8		R/B BTM		
A9		B/R TOP		
AA		B/R MDL		
AB		B/R BTM		
AC		BTM SLP R		
AD		BTM SLP B		
AE		MDL SLP R		
AF		MDL SLP B		

Table 3-2 (5).

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
B0		TOP SLP R	Auto white balance adjustment	
B1		TOP SLP B		
B2		KEIKO R		
B3		KEIKO B		
B4		BTM UP		
B5		BTM DWN		
B6		MDL UP		
B7		MDL DWN		
B8		TOP UP	Auto white balance adjustment	
B9		TOP DWN		
BA		KEIKO		
BB		KEIKO DWN		
BC		R TOP LMT		
BD		R DWN LMT	Auto white balance adjustment	
BE		B TOP LMT		
BF		B IN TOP		
C0		B IN MAX		
C1		B OUT MIN		
C2		B OUT DWN		
C3		B DWN LMT		
C4		LL LMT		
C5		TM DIVID		
C6		BM DIVID		
C7		DELAY TM		
C8		FAST TM		
C9		OUT HYS OFF		
CA		OUT B HYS		
CB		————		
CC		————		
CD		————		
CE		————		
CF		————		
D0		SYSTEM	NTSC/PAL select	
D1		————		
D2		————		

Table 3-2 (6).

<table>
<tr><th>Adjust-ment Address</th><th>Adjustment Voltage Output Terminal</th><th>Adjustment Item</th><th>Remarks</th><th>Memo Column</th></tr>
<tr><td>D3</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D4</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D5</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D6</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D7</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D8</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>D9</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DA</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DB</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DC</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DD</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DE</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>DF</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>E0</td><td></td><td>DISPLAY MODE</td><td>The following adjustment mode is selected by changing the adjustment data.
<table>
<tr><th>Adjustment data.</th><th>Adjustment Mode</th></tr>
<tr><td>00</td><td>DISPLAY MODE R, B, CONT</td></tr>
<tr><td>01</td><td>NEW R, B</td></tr>
<tr><td>02</td><td>R RATIO</td></tr>
<tr><td>03</td><td>B RATIO</td></tr>
<tr><td>04</td><td>R GAIN</td></tr>
<tr><td>05</td><td>B GAIN</td></tr>
<tr><td>06</td><td>RM DATA</td></tr>
<tr><td>07</td><td>GM DATA</td></tr>
<tr><td>08</td><td>BM DATA</td></tr>
<tr><td>09</td><td>NORM R</td></tr>
<tr><td>0A</td><td>NORM B</td></tr>
<tr><td>0B</td><td>R DATA</td></tr>
<tr><td>0C</td><td>G DATA</td></tr>
<tr><td>0D</td><td>B DATA</td></tr>
<tr><td>0E</td><td>R_1, B AIM</td></tr>
<tr><td>0F</td><td>ERROR</td></tr>
</table></td><td>00</td></tr>
<tr><td>E1</td><td></td><td>—</td><td></td><td></td></tr>
<tr><td>E2</td><td></td><td>—</td><td></td><td></td></tr>
</table>

Table 3-2 (7).

<table>
<tr><th>Adjust-ment Address</th><th>Adjustment Voltage Output Terminal</th><th>Adjustment Item</th><th>Remarks</th><th>Memo Column</th></tr>
<tr><td>E3</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E4</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E5</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E6</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E7</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E8</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>E9</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>EA</td><td></td><td>————</td><td></td><td></td></tr>
<tr><td>EB</td><td></td><td>MODE</td><td>The following adjustment mode is selected by changing the adjustment data.
<table>
<tr><th>Adjustment Data</th><th>Adjustment Mode</th></tr>
<tr><td>00</td><td>NORMAL</td></tr>
<tr><td>01</td><td>F-HANTING</td></tr>
<tr><td>03</td><td>ZOOM-POSI</td></tr>
<tr><td>05</td><td>IRIS-POSI</td></tr>
<tr><td>0B</td><td>AGC-CONT</td></tr>
<tr><td>0D</td><td>FOCUS-POSI</td></tr>
<tr><td>11</td><td>SHUTTER IN/OUT</td></tr>
<tr><td>13</td><td>AE LEVEL</td></tr>
<tr><td>ED</td><td>FILTER-FHM</td></tr>
<tr><td>EF</td><td>FILTER-FAM</td></tr>
<tr><td>F1</td><td>FILTER-SFH L</td></tr>
<tr><td>F3</td><td>FILTER-SFH H</td></tr>
<tr><td>F5</td><td>FILTER-SFA L</td></tr>
<tr><td>F7</td><td>FILTER-SFA H</td></tr>
<tr><td>F9</td><td>FILTER-FA L</td></tr>
<tr><td>FB</td><td>FILTER-FH L</td></tr>
<tr><td>FD</td><td>FILTER-FA H</td></tr>
<tr><td>FF</td><td>FILTER-FH H</td></tr>
</table></td><td></td></tr>
<tr><td>EC</td><td></td><td>AWB MODE 3</td><td></td><td></td></tr>
<tr><td>ED</td><td></td><td>AWB MODE 2</td><td></td><td></td></tr>
<tr><td>EE</td><td></td><td>AWB MODE 1</td><td>The following auto white balance adjustment mode is selected by changing the adjustment data.
<table>
<tr><th>Adjustment Data</th><th>Adjustment Mode</th></tr>
<tr><td>00</td><td>AWB MODE 1</td></tr>
<tr><td>10</td><td>WB DIRECT</td></tr>
<tr><td>F0</td><td>WB FREE</td></tr>
<tr><td>01</td><td>3200k Data fetch 1</td></tr>
<tr><td>23</td><td>3200k Data fetch 2</td></tr>
</table></td><td></td></tr>
</table>

Table 3-2 (8).

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column
EF		————		
F0		————		
F1		————		
F2		————		
F3		————		
F4		————		
F5		————		
F6		————		
F7		————		
F8		————		
F9		————		
FA		————		
FB		————		
FC		————		
FD		————		
FE		————		
FF		————		

Table 3-2 (9).

3-2-4. Checkpoint Array

Most measurement points for adjustment of the camera block are concentrated on the checkpoint array of the VC-67P board.

Solder a short lead wire, etc. to the terminal required for adjustment and connect an oscilloscope. Table 3-3 shows the terminal numbers and signal names of the checkpoint array.

Terminal No.	Signal Name	Terminal No.	Signal Name
A1	N.C	B1	N.C
A2	PG CONT	B2	N.C
A3	N.C	B3	Y (LPF) OUT
A4	N.C	B4	V SUB
A5	VAP OUT	B5	VAP SLICE
A6	TP	B6	N.C
A7	WB-G	B7	Y_H GAIN
A8	CAM Y	B8	Y_2 GAIN
A9	YH	B9	N.C
A10	CAM C	B10	GND
A11	YH OUT 1	B11	IRIS OUT

Table 3-3.

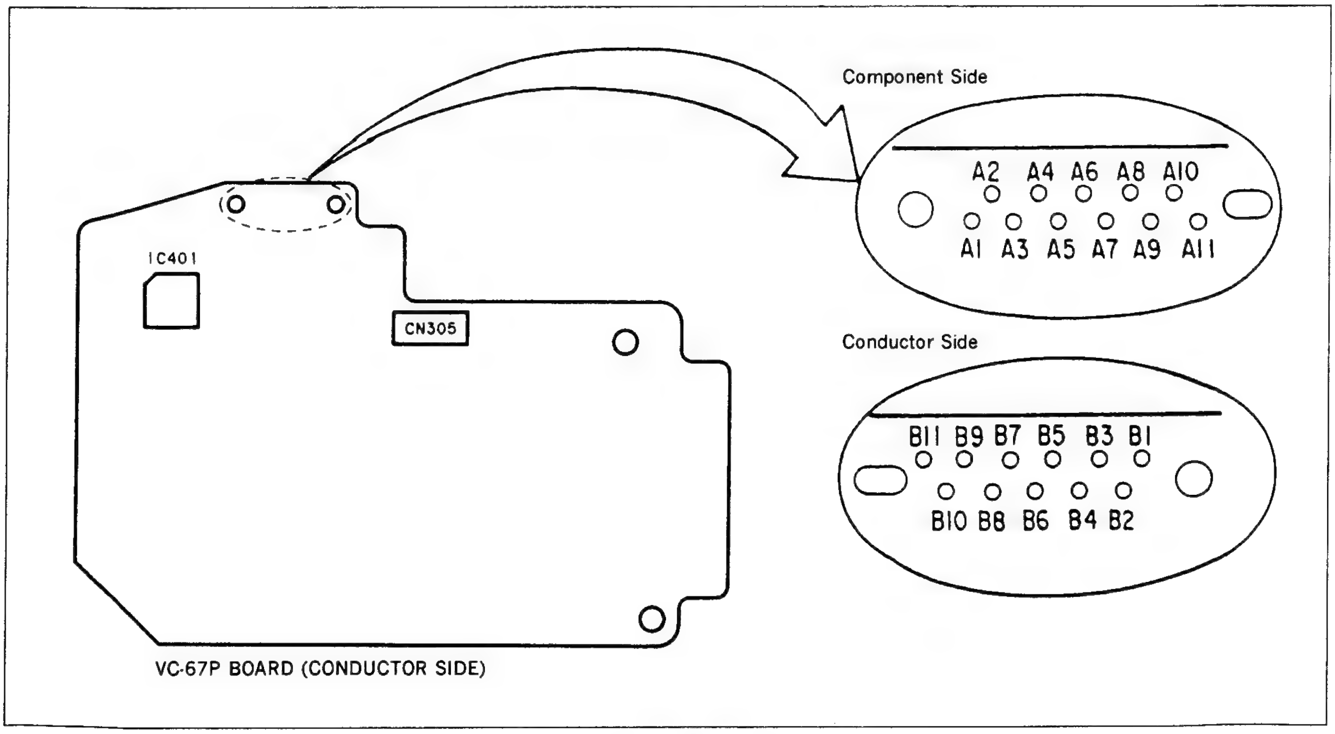


Fig. 3-8.

3-2-5. AF Microcomputer Data Reader Jig

The AF microcomputer data reader jig converts adjustment serial data outputted from the AF microcomputer (AF-54P board CN801) (different data are outputted depending on the adjustment mode, such as HALL (iris) state, focus state, focus motor speed, zoom ring position, etc.) into 2-digit hexadecimal numbers and indicates on the LED.

Note :

Change the fixed number of R1 from 10kΩ to 100kΩ in the AF microcomputer data reading jig. (If the number is kept to 10K, the adjustment data can not change because of the difference of the impedance.)
When adjusting the old-model Handy Cam, 100kΩ is allowed to perform the adjustment.

[Connection]

Connect as shown in the figure below :
adjustment mode, such as HALL (iris) state, focus state, focus motor speed, zoom ring position, etc.) into 2-digit hexadecimal numbers and indicates on the LED.

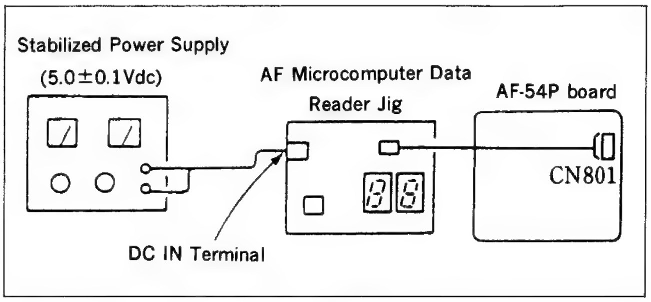


Fig. 3-9.

3-2-6. Data Processing

In order to obtain adjustment data in some adjustment items, it is necessary to compute the display data (hexadecimal number) of the AF microcomputer data reader jig and adjustment remote control.

In this case, convert the hexadecimal number into the decimal number before computation, convert its computed result back into the decimal number to assume it as the adjustment data. Table 3-4 shows a hexadecimal-decimal conversion table.

Hexadecimal — Decimal Conversion Table

Higher Digit of Hex. No. / Lower Digit of Hex. No.	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	② ↓ D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
①→ B (b)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: Values in parentheses are those displayed on the AF microcomputer reader jig or adjustment remote control.

(Example) When the AF microcomputer reader jig or adjustment remote control displays "BD (bd)";
Since the higher digit of the hexadecimal number is B (b) and its lower digit is D (d), the decimal number to be obtained is "189" at an intersecting point of ① and ② in the table above.

Table. 3-4.

3-3. ADJUSTMENT OF CAMERA SYSTEM

- In principle, all adjustments must be made in accordance with Adjustment procedure.
- When replacing lens, do not forget to make the following adjustment.

[Adjustment Sequence]

1) 3-3-3. Flange Back Adjustment
2) 3-3-31. MACRO area Adjustment
3) 3-3-7. HALL Adjustment
4) 3-3-8. IRIS Adjustment
5) 3-3-9. Shutter IN/OUT Adjustment

- When replacing CCD imager, do not forget to adjust the camera system property.

3-3-1. Prime Oscillation Adjustment (CD-20P Board)

Object	Color bar chart standard picture frame
Measurement point	DT-77P board pin ② (CL143)
Measurement instrument	Frequency counter
Adjustment element	CT122
Specified value	14187500±71Hz

Note : Connect the frequency counter through a buffer amplifier (Oscilloscope, etc.) having high impedance and low capacitance.

[Adjustment Method]

1) Adjust to 14187500±71Hz with CT122.

3-3-2. PLL Adjustment (CD-20P Board)

Object	Optional
Measurement point	See Fig. 3-10.
Measuring instrument	Digital voltmeter
Adjustment element	CT121
Specified value	2.5±0.2Vdc

[Adjustment Method]

1) Adjust to 2.5±0.2Vdc with CT121.

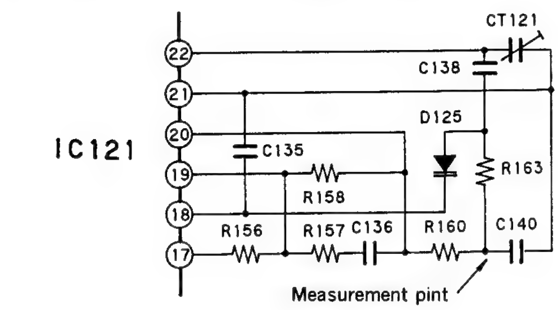


Fig. 3-10.

3-3-3. Flange Back Adjustment

Object	Siemens star (at 2 m in front of the lens datum level ϕ mark)
Measurement point	Check with the monitor TV.
Measuring instrument	Check with the monitor TV.
Adjustment element	Flange back adjusting pin
Tools	Phillips screwdriver

[Adjustment Method]

1) Press the FOCUS button (CK-20P board S673) to select the MANUAL mode.
2) Place the Siemens star at a distance of 2 m in front of the lens datum level (refer to Fig. 3-2).
3) Adjust a camera block position to center the Siemens star on the monitor screen with the monitor screen.
4) Check that the lens zoom lever can be moved fully to the WIDE end (8.5 mm) and TELE end (68 mm), respectively, and fix it at the WIDE end. (When this is done, check also zooming operation on the monitor screen.)
5) Set the lens focusing mark at the center of “2”.

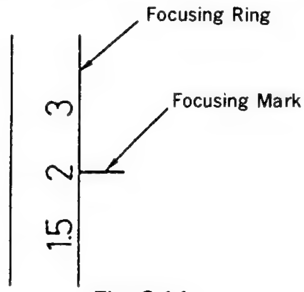


Fig. 3-11.

6) Loosen the flange back setscrew ❶ with the Phillips screwdriver. (Refer to Fig. 3-13)
7) Viewing the monitor screen, turn the glange back adjusting pin ❷ to make clearest the wedge located at the center of the Siemens star on the screen. (Turn it 2 to 3 times to the right and left to check the wedge to be clearest.)
   Note : Do not turn the adjusting pin excessively in one direction at a time.
8) Holding the flange back adjusting pin ❷ not to turn it further, tighten the flange back setscrew ❶.
9) With the zoom lever fixed at the WIDE end, turn the focusing ring and stop it at a position which provides the clearest image of the wedge. Check that the focusing ring is within the range shown in Fig. 3-12 at this time.

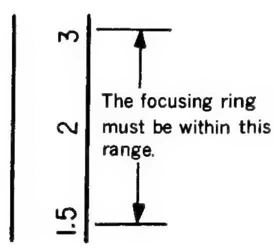


Fig. 3-12.

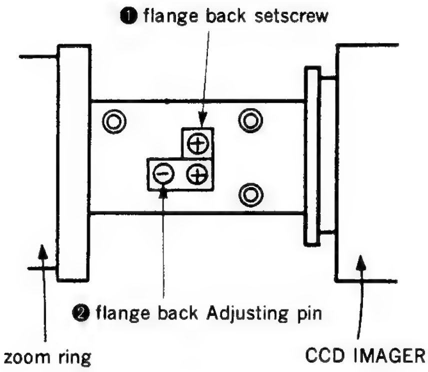


Fig. 3-13.

10) Fix the zoom lever at the TELE end.
11) Turn the focusing ring and stop it at a position which provides the clearest wedge image. When this is done, check that the focusing ring is within a range of ±1.5mm from the center of "2".

3-3-4. Camera DC-DC Converter Voltage Check (VC-67P Board/CD-20P Board)

Measuring isntrument	Digital voltmeter
15V check	
Measurement point	CN101 pin ① (CD-20P Board)
Specified value	$15.0 \pm 0.2V_{DC}$
−9V check	
Measurement point	CN101 pin ② (CD-20P Board)
Specified value	$-9.00 \pm 0.15V_{DC}$
4.9V check	
Measurement point	CN101 pin ③ (CD-20P Board)
Specified value	$4.9 \pm 0.1V_{DC}$
CAM 4.9V check	
Measurement point	CN304 pin ④ (VC-67P Board)
Specified value	$4.9 \pm 0.1V_{DC}$

[Checking Method]

1) Each supply voltage must meet the specified value.

3-3-5. EVR Initial Setting of adjustment page F

Set to the following initial settings of the adjustment data only when the CCD IMAGER was replaced.
Make initial setting of adjustment data when the EVR/AWB microcomputer is replaced.
(Pre-replacement microcomputer data will do.)

Adjustment Address	Adjustment Data Initial Value
0E (Y LEVEL)	9C
0F (VAP GAIN)	90
12 (VSUB CONT)	3A
13 (PG CONT)	5A
14 (Yr CONT)	AE
15 (WHITE CLIP)	FF
18 (MAX GAIN)	E0
19 (IRIS REF)	4C
1F (FADER CONT)	00
25 (IN OUT)	00
26 (M12-THR)	20
27 (KATAMUKI)	04
28 (FA-WM)	03
2D (FA-SML)	00
2F (FH-SML)	00
30 (LOW-F-SPEED)	32
31 (MAN-F-SPEED)	22

Adjustment Address	Adjustment Data Initial Value
32 (STEP-A)	02
33 (END-SENS-V)	20
34 (ZOOM-POSI 1)	0F
35 (ZOOM-POSI 2)	3C
36 (ZOOM-POSI 3)	6B
37 (ZOOM-POSI 4)	9A
38 (ZOOM-POSI 5)	CA
39 (FOCUS-POSI 1)	48
3A (SEARCH-V)	00
3B (BACK RUSH 2)	02
3C (BACK RUSH-MODE 3)	05
3D (ZOOM-TAN-MASK)	50
3E (ZOOM-END-V)	01
3F (ZOOM-MODOSI)	00
40 (BACK RUSH-ZOOM)	08
41 (NOT WIDE STOP)	00
42 (MODE 12 NG THR)	02
43 (FA-BASE H-IN)	20
44 (FA-BASE-OUT)	0F
47 (MODE 12 NG LIMIT H)	02
48 (MODE 12 NG LIMIT L)	00
49 (M2 HANTEN)	04
4A (MODE 5 THR 1)	06
4B (YOGIRI-IN)	1E
4C (MODE 5 FH FLT)	01
4D (MODE 5 THR 2 IN)	70
4E (MODE 5 THR 3)	1E
4F (FH-NG-COUNT)	1E
50 (TYUU WAKU)	00
51 (YOGIRI-OUT)	1E
52 (MODE 5 THR 20 OUT)	1E
53 (AF IRIS IN OUT)	B9
54 (MACRO TIME OUT H)	07
55 (MACRO TIME OUT L)	00
56 (MACRO SEARCH)	01
57 (SEISHI)	02
58 (ZOOM-SPEED 1)	20
59 (ZOOM-SPEED 2)	20
5A (ZOOM-SPEED 3)	20
5B (ZOOM-SPEED 4)	53
5C	00
5D	02

Adjustment Address	Adjustment Data Initial Value
60 (IRIS REF NOR)	60
61 (IRIS REF PO)	60
62 (IRIS REF SP)	60
63 (IRIS DATA 1)	BE
64 (GAIN-REF)	30
65 (GAIN-MAX)	E0
66 (EMG AGC)	A0
67 (EMG-AGC-HYS)	05
68 (EMG-AE (H))	06
69 (EMG-AE (L))	00
6A (EMG-AE-HYS (H))	01
6B (MAX SHUT-PO (H))	00
6C (MAX SHUT-PO (L))	CE
6D (MAX SHUT-SP (H))	00
6E (MAX SHUT-SP (L))	E6
6F (REF-WIDTH (H))	01
70 (REF-WIDTH (L))	00
71 (SHUT-MULTI (H))	06
72 (SHUT-MULTI (L))	00
73 (SHUT-COUNT 1)	06
74 (SHUT STEP-MULTI)	02
75 (IRIS-OPEN)	20
76 (REF-TURBO (H))	06
77 (REF-TURBO (L))	00
78 (TURBO-WIDTH (H))	01
79 (TURBO-WIDTH (L))	00
7A (TURBO-TR (H))	01
7B (TURBO-TR (L))	00
7C (SHUT-COUNT 2)	01
7D (SHUT-COUNT 3)	01
80 (USER R-Y GAIN)	10
81 (USER B-Y GAIN)	0D
82 (USER B-Y HUE)	0D
83 (USER R-Y HUE)	0C
84 (USER SHP LEVEL)	0A
85 (USER Y LEVEL)	0C
96 (SHUTTER IN)	B1
97 (SHUTTER OUT)	8B
AC (BTM SLP R)	30
AD (BTM SLP B)	70
AE (MDL SLP R)	40
AF (MDL SLP B)	40

Adjustment Address	Adjustment Data Initial Value
B1 (TOP SLP B)	10
B2 (KEIKO R)	80
B3 (KEIKO B)	30
B4 (BTM UP)	CF
B5 (BTM DWN)	98
B6 (MDL UP)	BE
B7 (MDL DWN)	9B
BA (KEIKO)	C4
BB (KEIKO DWN)	AC
BC (R TOP LMT)	A0
C3 (B DOWN LMT)	26
C4 (LL LMT)	06
C5 (TM DIVID)	6E
C6 (BM DIVID)	41
C7 (DELAY TM)	0A
C8 (FAST TM)	30
C9 (OUT HYS OFF)	15
CA (OUT B HYS)	0D
D0 (SYSTEM)	01
EC (AWB MODE 3)	01
ED (AWB MODE 2)	00
EE (AWB MODE 1)	00

Table. 3-5.

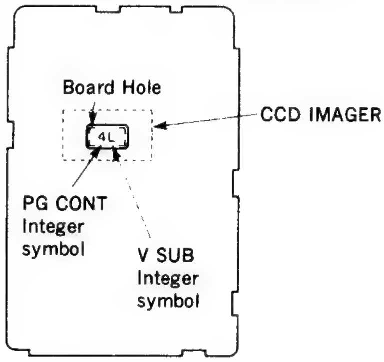
[Adjustment Method]

1) Set the adjustment page to F with the adjustment remote control.
2) Set the adjustment data for each adjustment address to the initial value with the adjustment remote control.
3) Change the adjustment address in order to memorize the last adjustment data.

3-3-6. PG CONT/V SUB Adjustment (VC-67P Board)

Note : PG CONT specified voltage and V SUB specified volatage are indicated by the two digits on CCD imager.

VC-67P BOARD (CONDUCTOR SIDE)



● PG CONT

Integer symbol	Voltage (V)
0	0.5
1	1.0
2	1.5
3	2.0
4	2.5
5	3.0
6	3.5
7	4.0

● V SUB

Integer symbol	Voltage (V)	Integer symbol	Voltage (V)	Integer symbol	Voltage (V)
A	7.0	J	11.0	S	15.0
B	7.5	K	11.5	T	15.5
C	8.0	L	12.0	U	16.0
D	8.5	M	12.5	V	16.5
E	9.0	N	13.0	W	17.0
F	9.5	P	13.5	X	17.5
G	10.0	Q	14.0	Y	18.0
H	10.5	R	14.5	Z	18.5

Example : For「4L」display,
•PG CONT=2.5V
•V SUB=12.0V

Fig. 3-14.

A. PG CONT Adjustment

Object	Not used
Measurement point	Checkpoint array pin (A2) (PG CONT)
Measuring instrument	Digital voltmeter
Adjustment page	F
Adjustment address	13 (PG CONT)
Specified value	(CCD imager specified voltage) $\pm 0.1V_{dc}$

[Adjustment Method]

1) Set the adjustment page F and the adjustment address 13 with the adjustment remote control.
2) Change the adjustment data to be (CCD imager specified voltage) ± 0.1Vdc with the adjustment remote control.
3) Change the adjustment address to store the adjustment data.

B. V SUB Adjustment

Object	Not used
Measurement point	Checkpoint array pin (B4) (V SUB)
Measuring equipment	Digital voltmeter
Adjustment page	F
Adjustment address	12 (V SUB)
Specified value	(CCD imager specified voltage) ±3%

[Adjustment Method]

1) Set the adjustment page F and the adjustment address 12 with the adjustment remote control.
2) Change the adjustment data to be (CCD imager specified voltage) ±3% with the adjustment remote control.
3) Change the adjustment address to store the adjustment data.

3-3-7. HALL Adjustment (AF-54P Board)

Object	All white chart All black (Put a black cap over lens)
Measurement point	CN801
Measuring instrument	AF μ COM data reader jig
Adjustment page	F
Adjustment address	1B (HALL GAIN) 1C (HALL OFFSET)
Specified value	1B : 03 1C : C or D

[Adjustment Method]

1) Set the adjustment page to F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 05 with the adjustment remote controller.
3) Make all white chart in the color bar standard frame.
4) Set the adjustment address 1B and the adjustment data 20 with the adjustment remote controller. Set the adjustment address 1C and adjustment data 00.
5) Read this data of the AF microcomputer data reading jig. (Set this data as W_2 and input to the address 8B)
6) When this value is over F8, adjust the address 1C to F8± 03. Input this value of 1C to the address 87. When the value is below F8, set the data 00 of the address 87.
7) Set the adjustment address 1B and the adjustment data 00 with the adjustment remote controller.
8) Read this data of the AF microcomputer data reading jig. (Set this data as W_1 and input to the address 8A)
9) Cover the lens with black cap and make all black. (Open iris.)
10) Read this data of the AF microcomputer data reading jig. (Set this data as K_1 and input to the address 88)
11) Set the adjustment address 1B and the adjustment data 20 with the adjustment remote controller.
12) Read this data of the AF microcomputer data reading jig. (Set this data as K_2 and input to the address 89)
13) Obtain C by the following formula.

$$C=\frac{(C0+K_1-W_1)\times\triangle K+03+\triangle W}{\triangle K+\triangle W}\quad\begin{pmatrix}\triangle K=K_1-K_2\\ \triangle W=W_2-W_1\end{pmatrix}$$

14) Set the adjustment address 1B and the adjustment data 00 with the adjustment remote controller. Adjust the adjustment address 1C so that the data of the AF microcomputer data reading jig is D.
15) Set the adjustment address 1B with the adjustment remote controller. Change the adjustment data and set the data of the AF microcomputer data reading jig to 03.
16) Make all white chart in the color bar standard frame and read the data of this AF microcomputer reading jig. (Set this data as W_0 . When W_0=C0±01, the adjustment is completely performed. So set the adjustment data of the adjustment address EB to 00. When the above range is not satisfied, go to the following procedures.)
17) Obtain E by the following formula.

$$E=\frac{C0\times\triangle K+W_0\times\triangle W}{\triangle K+\triangle W}\quad\begin{pmatrix}\triangle K=K_1-K_2\\ \triangle W=W_2-W_1\end{pmatrix}$$

18) Set the adjustment address 1C with the adjustment remote controller. Change the adjustment data and set the data of the AF microcomputer data reading jig to E.
19) Set the adjustment address 1B with the adjustment remote controller. Chage the adjustment data and set the data of the AF microcomputer data reading jig to C0.
20) Cover the lens with black cap and make all black. (Open iris.)
21) Confirm that the data of the AF microcomputer data reading jig is 03±02.
22) Set the adjustment address EB and the adjustment data 00 with the adjustment remote controller.
23) Change the adjustment address in order to store the adjustment data.

3-3-8. IRIS Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Filter	ND filter 0.4 and 0.1
Measurement point	Checkpoint array pin (B11) (IRIS OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	19 (IRIS)
Specified value	150±10 mV

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 19 with the adjustment remote control.
2) With no ND filter attached, change the adjustment data with the adjustment control to adjust the IRIS OUT signal level to 150±10 mV.
3) Attach the ND filter 0.5 (0.4+0.1) in front of the lens and check that the signal level changes smoothly.
4) Remove the ND filter and check that the signal level is 150±20 mV.
5) When the specified value is not met, repeat the steps 2) through 4).
6) Change the adjustment address in order to store the adjustment data.

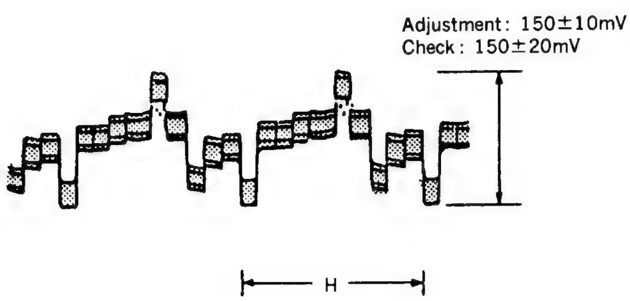


Fig. 3-15.

3-3-9. Shutter IN/OUT Adjustment (AF-54P Board)

Object	White pattern standard picture frame
Filter	ND filter: 0.4×2pcs., 0.1×1pc.
Measurement point	CN801
Measuring instrument	AF microcomputer data reader jig
Adjustment page	F
Adjustment address	96 (SHUTTER IN) 97 (SHUTTER OUT)
Specified value	Data A Data B

[Adjustment Method]

1) Select the adjustment page F and the adjustment address EB with the adjustment remote control.
2) Attach the ND filter 0.8 (0.4+0.4) to the front of the lens, and read the AF jig data (This data is assumed as data A.)
3) Detach the ND filter 0.8, and attach the ND filter 0.5 (0.4+0.1).
4) Read the AF jig data. (This data is assumed as data B)
5) Set the adjustment address 96 by adjustment remote control and enter to the adjustment data A.
6) Set the adjustment address 97 by adjustment remote control and enter to the adjustment data B.
7) Change the adjustment address to EB to set the adjustment data to 00.
8) Change the adjustment address in order to store the adjustment data.

3-3-10. Manual Gain Data Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Filter	ND filter 2.5 (1.0+1.0+0.4+0.1)
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin Ⓐ8 (CAM Y)
Measuring instrument	Oscilloscope AF microcomputer data reading jig
Adjustment page	F
Adjustment address	65 (MAX GAIN) 7E 64 (GAIN REF)
Specified value	130±5 mV $(D_{64}-D_{7E}) < 18$

Note : Although four ND filters are used, adjust with your ND filters if three or less of them make 2.5.

[Adjustment Method]

1) Set the adjustment page to F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 0B with the adjustment remote control.
3) Turn off the AUTO LOCK switch (CK-20P board S670).
4) Set the manual mode with the PROGRAM AE button (CK-20P board S672).
5) Cover the lens with the ND filter 2.5 (1.0+1.0+0.4+0.1).
6) Set the adjustment address 65 with the adjustment remote control.
7) Change the adjustment data so that the width between the center of the pedestal level and the center of the white level is 130±5mV.

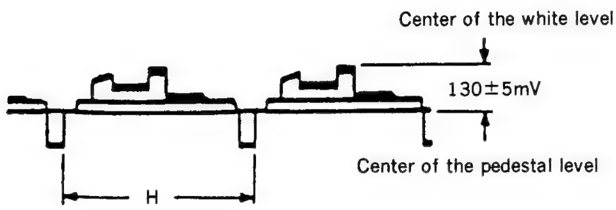


Fig. 3-16.

8) Remove the ND filter 2.5.
9) Input the value of the AF microcomputer data reading jig to the adjustment address 7E.
10) Perform the following calculations.

   (D_{64} : Adjustment data of the adjustment address 64
   D_{7E} : Adjustment data of the adjustment address 7E)

$$(D_{64}-D_{7E}) < 18$$

11) When the above items are satisfied, input (D_{64} + 08) to the adjustment data of the adjustment address 64.
12) After the adjustment, set the adjustment address EB and the adjustment data 00.

3-3-11. AGC Adjustment (VC-67P Board)

Note : When there is much noise, measure by inserting 5.6kΩ resistance.

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin Ⓑ3 (Y (LPF) OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	1A (AGC)
Specified value	180±5 mV

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 1A with the adjustment remote control.
2) Change the adjustment data with the adjustment remote control to set the Y (LPF) signal level to 180±5 mV.
3) Change the adjustment address in order to store the adjustment data.

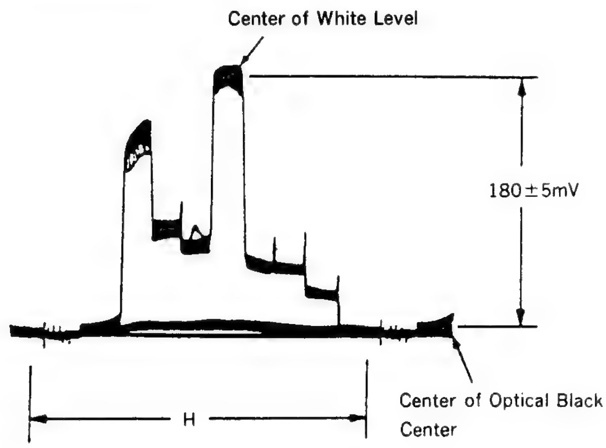


Fig. 3-17.

3-3-12. Matrix Adjustment

(1) Y1 Gain Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A5) (VAP OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	07 (Y_1 Gain)
Specified value	$Y_0 - Y_1 = 0 \pm 5mV$

[Preparation]

1) Short the checkpoint array pin (B8) (Y_2 Gain) and pin (B5) (VAP SLICE) with GND.

[Adjustment Method]

1) Select the adjustment page F with the adjustment remote control.
2) Select the adjustment address 0F by the adjustment remote control and preset the adjustment data to be 00. (VAP GAIN : MAX)
3) Select the adjustment address 07 by the adjustment remote control.
4) Change the adjustment data and set the $Y_0 - Y_1$ waveform to be a straight line. (There should not be difference.)
5) Change the adjustment address in order to store the adjustment data.
6) Open the checkpoint array pin (B8) and pin (B5).

Note : After the adjustment, be sure to adjust the matrix (2) Y_2 Gain Adjustment.

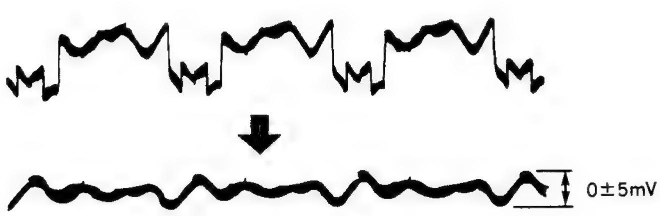


Fig. 3-18.

(2) Y_2 Gain Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A5) (VAP OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	06 (Y_2 GAIN)
Specified value	$0 \pm 5mV$

[Preparation]

1) Short the chickpoint array pin (B5) (VAP SLICE) with GND.

[Adjustment Method]

1) Select the adjustment page F by the adjustment remote control.
2) Select the adjustment address 0F by the adjustment remote control and preset the adjustment data to be 00. (VAP GAIN : MAX)
3) Select the adjustment address 06 by the adjustment remote control.
4) Change the adjustment data and set the $(Y_1 - \frac{Y_0 + Y_2}{2})$ waveform to be a straight line. (There should not be difference.)
5) Select the adjustment address 0F by the adjustment remote control and set the adjustment data to be 90.
6) Change the adjustment address in order to store the adjustment data.
7) Open the checkpoint array pin (B5).

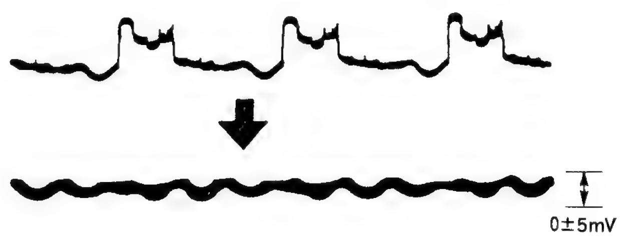


Fig. 3-19.

(3) C_1 Gain Adjustment

Object	Color bar chart standard picture frame
Measurement point	VIDEO OUT terminal
Measuring instrument	Vectorscope
Adjustment page	F
Adjustment address	03 (C_1 GAIN)
Specified value	Minimize the divided bright point. (Cyan, green ···Within 2.0 mm / Magenta ···Within 1.0 mm / Others ···Within 0.5 mm)

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 03 by the adjustment remote control.
2) Change the adjustment data to coincide each color bright point.
3) Change the adjustment address in order to store the adjustment data.

Specified Values When Vectorscope is used.
(Specified value :Cyan, Green. . . . Within 2.0mm
Magenta. . . . Within 1.0mm
Others. . . . Within 0.5mm)

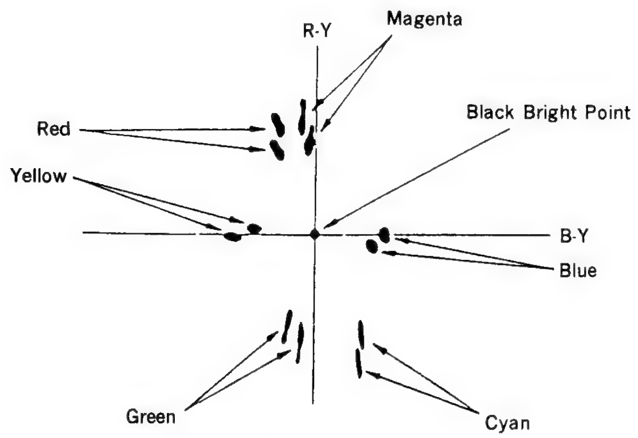


Fig. 3-20.

3-3-13. Y_H Level Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A6) (TP)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	08 (Y_H GAIN)
Specified value	0±5mV

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 08 by the adjustment remote control.
2) Change the adjustment data by the adjustment remote control in order that the output is a straght line. (There should not be difference : 0+5mV)
3) Change the adjustment address in order to store the adjustment data.

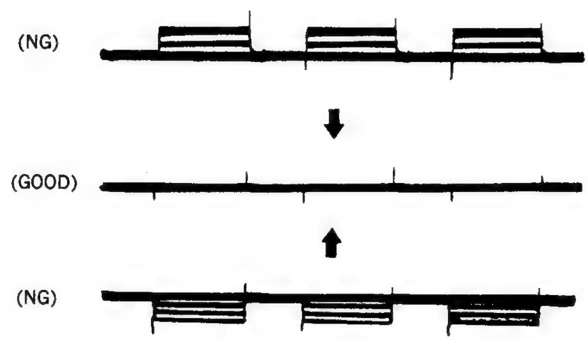


Fig. 3-21.

3-3-14. Chroma Level Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A7) (WB-G)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	11 (C LEVEL)
Specified value	320±20mV

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 11 with the adjustment remote control.
2) Change the adjustment data with the adjustment remote control to adjust the White level to 320±20 mV.
3) Change the adjustment address in order to store the adjustment data.

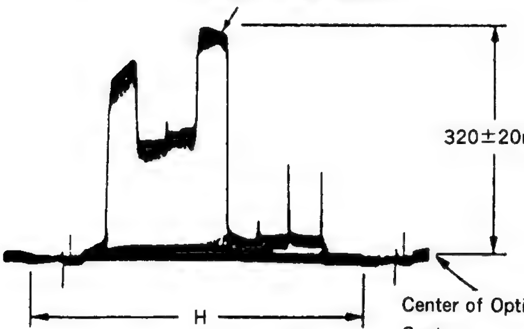


Fig. 3-22.

3-3-15. Sync. Level Adjustment (VC-67P Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	16 (SYNC LEVEL)
Specified value	150±5mV

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 16 with the adjustment remote control.
2) Change the adjustment data with the adjustment remote control to adjust the sync. level to 150±5mV.
3) Change the adjustment address in order to store the adjustment data.

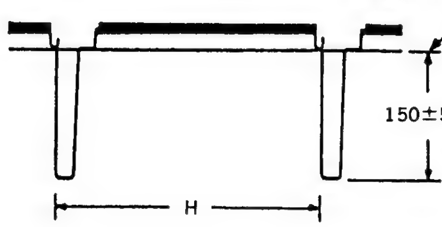


Fig. 3-23.

3-3-16. Setup Adjustment (VC-67P Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	10 (SET UP) 18 (MAX GAIN)
Specified value	15±5mV

[Adjustment Method]

1) Select the adjustment page F with the adjustment remote control.
2) Select the adjustment address 18 with the adjustment remote control, make note of the adjustment data of this address (data F), and then, set the adjustment data to 00.
3) Select the adjustment address 10 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control to adjust the setup level to 15±5mV.
5) Select the adjustment address 18 and enter to the adjustment data F.
6) Change the adjustment address in order to store the adjustment data.

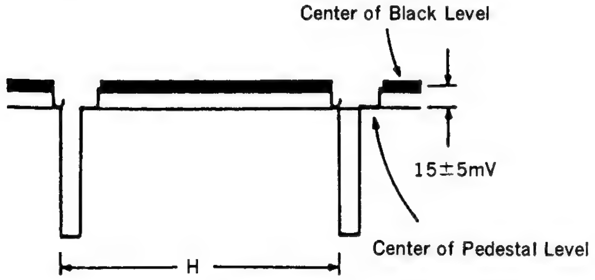


Fig. 3-24.

3-3-17. White Clip Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	15 (WC) 0E (Y LEVEL)
Specified value	420±10mV

[Adjustment Method]

1) Select the adjustment page F with the adjustment remote control.
2) Select the adjutment address 0E with the adjustment remote control, make note of the adjustment data of this address (data G), and then, set the adjustment data to FF.
3) Set the adjustment address to 15 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control to adjust the white clip level to 420±10mV.
5) Select the adjustment address 0E and enter to adjustment data F.
6) Change the adjustment address in order to store the adjustment data.
7) Make Y level adjustment as described in 3-3-18.

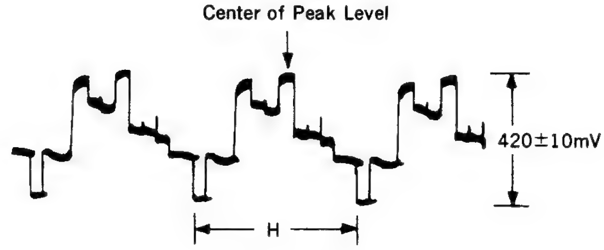


Fig. 3-25.

3-3-18. Y Level Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	0E (Y LEVEL)
Specified value	320±5mV

[Adjustment Method]

1) Check that the specified value in "3-3-17 White Clip Adjustment" is met.
2) Select the adjustment page F and the adjustment address 0E with the adjustment remote control.
3) Change the adjustment data with the adjustment remote control and adjust the Y signal level to 320±5mV.
4) Change the adjustment address in order to store the adjusment data.

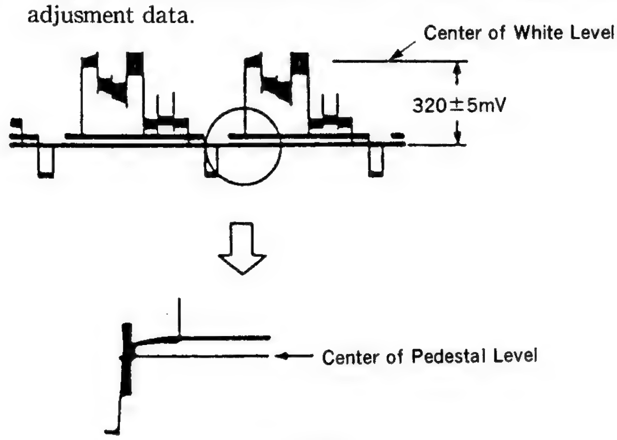


Fig. 3-26.

3-3-19. H Aperture Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	0D (SHP LEVEL)
Specified value	40±5mV

[Adjustment Method]

1) Turn the focusing ring to maximize the aperture level (waveform peak).
2) Select the adjustment page F and the adjustment address 0D with the adjustment remote control.
3) Change the adjustment data with the adjustment remote control to set the aperture level (lower peak between "green" and "white") to a point 40±5mV above the pedestal level.
4) Change the adjustment address in order to store the adjustment data.

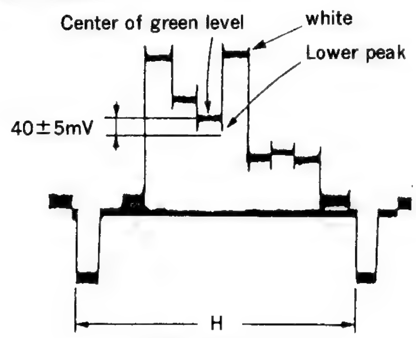


Fig. 3-27.

3-3-20. Max. Gain Adjustment (VC-67P Board)

Object	Color bar chart standard picture frame
Filter	ND filter: 1.0×2pcs., 0.4 and 0.1×2pcs. each
Measurement point	CN307 pin ① (Y OUT) or checkpoint array pin (A8) (CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	18 (MAX GAIN)
Specified value	150±5mV

[Adjustment Method]

1) Cover the lens with the ND filter 2.6 (1.0+1.0+0.4+0.1+0.1).
2) Select the adjustment page F and the adjustment address 18 with the adjustment remote control.
3) Change the adjustment address with the adjustment remote control to adjust the Y signal level to 150±5mV.
4) Change the adjustment address in order to store the adjustment data.

Note: Although the ND filter is combined by using 5 pcs, if your ND filter is combined by using 3 pcs or less, resulting in 2.5, this combination should be available.

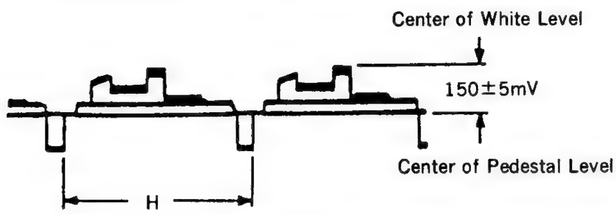


Fig. 3-28.

3-3-21. Burst Level Adjustment (VC-67P Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	CN307 pin ③ (C OUT) or checkpoint array pin (A10) (CAM C)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	17 (BURST LEVEL)
Specified value	150±5mVp-p

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 17 with the adjustment remote control.
2) Change the adjustment data with the adjustment remote control to adjust the burst level to 150±5mVp-p.
3) Change the adjustment address in order to store the adjustment data.

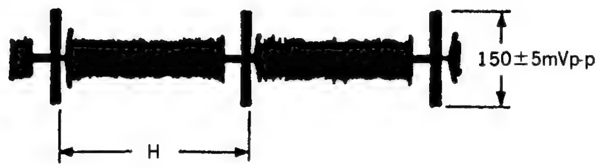


Fig. 3-29.

3-3-22. Standard AE Level Adjustment (AF-54P Board)

Object	Color bar chart standard picture frame, All black (Cover with a black cap)
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig
Adjustment page	F
Adjustment address	60 (IRIS REF-NOR) 61 (IRIS REF-PO) 62 (IRIS REF-SP)
Specified value	$(C_{60}-D_{8C})>24(D_{60}-08)$

[Adjustment Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 13 with the adjustment remote control.
3) Input the value of the AF microcomputer data reading jig to the adjustment address 60. (This adjustment data of the adjustment address is set to D_{60})
4) Make all black. (Cover with a black cap)
5) Input the value of the AF microcomputer data reading jig to the adjustment address 8C. (This adjustment data of the adjustment address 8C is set to D_{8C})
6) Check that it is $(D_{60}-D_{8C})>24$. When the value of $(D_{60}-D_{8C})$ is between 21 and 24, set the adjustment data 76 from 71 and the adjustment data 05 from 06.
7) Input the value of $(D_{60}-D_{8C})$ to the adjustment address 61 and 62.

Example)

The adjustment data D_{60} of the adjustment address 60	The input value of the adjustment address 60 and 61
5A	52
5B	53
5C	54

8) Set the adjustment address EB and the adjustment data 00 with the adjustment remote control.
9) Change the adjustment address in order to store the adjustment data.

3-3-23. Iris Manual Data Adjustment (AF-54P Board)

Object	White pattern standard picture frame
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig
Adjustment page	F
Adjustment address	63 (IRIS DATA 1)
Specified value	C0±01

[Adjustment Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 05 with the adjustment remote control.
3) Turn off the AUTO LOCK switch (CK-20P board S670) .
4) Change the adjustment data of the adjustment address 63 so that the value of the AF microcomputer data reading jig is C0±01.
5) Set the adjustment address EB and the adjustment data 00 with the adjustment remote control.
6) Change the adjustment address in order to store the adjustment data.

3-3-24. Warning Display Level Setting (AF-54P Board)

Object	Color bar chart standard picture frame
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig
Adjustment page	F
Adjustment address	66 (EMG AGC)

[Setting Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 0B with the adjustment remote control.
3) Turn off the AUTO LOCK switch (CK-20P board S670).
4) Input the value of the AF microcomputer data reading jig to the adjustment address 66.
5) Set the adjustment address EB and the adjustment address 00 with the adjustment remote control.
6) Change the adjustment address in order to store adjustment data.

3-3-25. AE Check

[Preparation]

1) Turn off the AUTO LOCK switch (CK-20P board S670).
2) Adjust to 1/2000 with the SHUTTER SPEED button (CK-20P board S671).

Note : Be sure to check in the order of 1 → 2 → 3 → 4.

1. Portrait Mode Check (AF-54P Board)

Object	White pattern standard picture frame
Filter	ND filter 1.0
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig
Adjustment page	F
Adjustment address	8D

[Checking Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the adjustment address EB and the adjustment data 11 with the adjustment remote control.
3) Set the portrait mode with the PROGRAM AE button.
4) Cover the lens with the ND filter 1.0.
5) After three seconds, input the value of the AF microcomputer data reading jig to adjustment address 8D.
6) Change the adjustment address in order to store the adjustment data.
7) 「2. Sports mode Check」 should be performed.

2. Sports Mode Check (AF-54P Board)

Object	All black (Cover the lens with a black cap)
Filter	ND filter 1.0
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig
Adjustment page	F
Adjustment address	8E
Specified value	FF

[Checking Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the sports mode with the PROGRAM AE button.
3) Cover the lens with the ND filter 1.0.
4) Cover with a black cap with the ND filter 1.0 installed.
5) After two seconds, input the value of the AF microcomputer data reading jig to the adjustment address 8E.
6) After two seconds, check that the value of the AF microcomputer data reading jig is FF.
7) Change the adjustment address in order to store the adjustment data.
8) 「3. iris preceding mode Check」 should be performed.

3. Iris Preceding Mode Check (AF-54P Board)

Object	White pattern standard picture frame All black (Cover with a black cap.)
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig and a monitor screen
Adjustment page	F
Adjustment address	8F
Specified value	When the object is all black, the ▶ mark on the monitor screen should be flashing and the value of the AF microcomputer data reading jig should be FF.

[Checking Method]

1) Set the adjustment page F with the adjustment remote control.
2) Set the iris preceding mode with the PROGRAM AE button.
3) After two seconds, the ▶ mark on the monitor screen should not be flashing.
4) Input the value of the AF microcomputer data reading jig to the adjustment address 8F.
5) Make all black (cover with a black cap).
6) After two seconds, check that the ▶ mark on the monitor screen is flashing.
7) Check that this value of the AF microcomputer data reading jig FF.
8) Change the adjustment address in order to store the adjustment data.
9) 「4. Shutter preceding mode Check」 should be performed.

4. Shutter Preceding Mode Check (AF-54P Board)

Object	All black (Cover with a black cap.)
Measurement point	CN801
Measuring instrument	AF microcomputer data reading jig and a monitor screen
Adjustment page	F
Specified value	The value of the AF microcomputer data reading jig should be FF.

[Checking Method]

1) Set the adjustment page F with the adjustment remote control.
2) Make all black (cover with a black cap).
3) Set the adjustment address 8F with the adjustment remote control.
4) Set the shutter preceding mode with the PROGRAM AE button.
5) Check that the value of the AF microcomputer data reading jig is FF.
6) Check that the ▶ mark on the monitor screen is not flashing.

   Note : After checking AE, set the adjustment address EB and the adjustment data 00. (Change the adjustment address in order to store the adjustment data.)

3-3-26 (A). Pre-white Balance Adjustment (With Vectorscope)

Object	All white pattern
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Adjustment page	F
Adjustment address	05 (R GAIN) 04 (B GAIN)
Specified value	The center of a white bright point must be within a circle of ϕ 1 mm centering around the origin

[Adjustment Method]

1) Maximize the gain of vectorscope.
2) Select the adjustment page F and the adjustment address 05 with the adjustment remote control.
3) Change the adjustment data with the adjustment remote control to coincide the white bright point with the origin.
4) Select the adjustment address 04.
5) Change the adjustment data to coincide the white bright point with the origin.
6) Repeat the steps 2) through 5).
7) Return the gain of vectorscope to CAL, and make sure that center of the bright point is located inside a circle of 1 mm diameter apart from the origin.
8) Change the adjustment address in order to store the adjustment data.

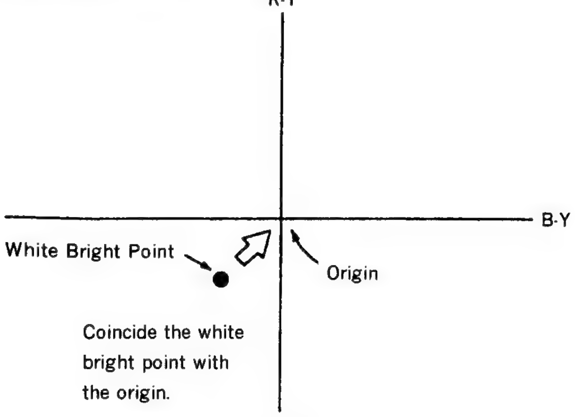


Fig. 3-30.

3-3-26 (B). Pre-white Balance Adjustment (With Oscilloscope) (VC-67P Board)

Object	All white pattern
Measurement point	CN307 pin ③ (C OUT) or checkpoint array pin (A10) (CAM C)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	05 (R GAIN) 04 (B GAIN)
Specified value	Chroma signal amplitude minimum

[Adjustment Method]

1) Select the adjustment page F and the adjustment address 05 with the adjustment remote control.
2) Change the adjustment data with the adjustment remote control to minimize a chroma signal amplitude.
3) Select the adjustment address 04.
4) Change the adjustment data to minimize the chroma signal amplitude.
5) Repeat the steps 1) through 4).
6) Change the adjustment address in order to store the adjustment data.

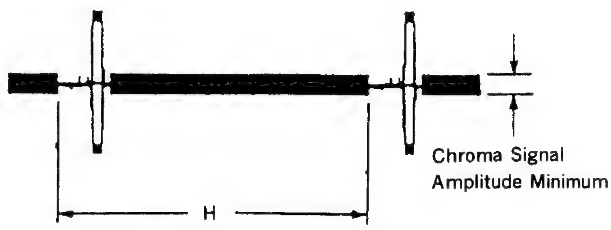


Fig. 3-31.

3-3-27. Color Reproducibility Adjustment (With Vectorscope)

Object	Color bar chart standard picture frame
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Adjustment page	F
Adjustment address	09 (R-Y GAIN) 0A (B-Y GAIN) 0B (R-Y HUE) 0C (B-Y HUE)
Specified value	All color bright points must be within a color reproduction frame.

Note : Burst level adjustment and pre-white balance adjustment must have been completed.

[Adjustment Method]

1) Set the adjustment page F with the adjustment remote control.
2) Change the adjustment data of each adjustment address with the adjustment remote control to collect all the color bright points within the color reproduction frame.
3) Change the adjustment address in order to store the adjustment data.

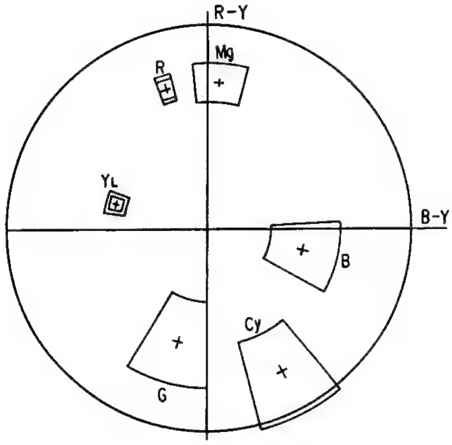


Fig. 3-32.

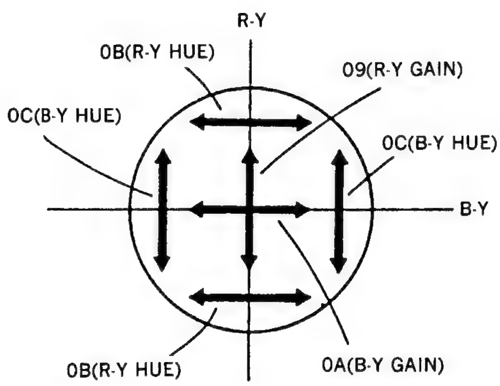


Fig. 3-33. Adjustment Addresses and Bright Point Moving Directions

3-3-28. Auto White Balance Adjustment

Note 1 : Be sure to make "preset adjustment" and "auto white balance adjustment" in that order.

(1) Preset Adjustment (VC-67P Board)

Object	White pattern standard picture frame
Adjustment page	F
Adjustment address	EE (AWB MODE 1)

Note 1 : Make preset adjustment 30 seconds or more after turning on the power.

Note 2 : When redoing preset adjustment, turn off the power once, and then, turn it on again.

[Adjustment Method]

1) Turn off/on the power.
2) Obtain a picture of white pattern for over five seconds. (AF switch is turned off.)
3) Select the adjustment page F with the adjustment remote control.
4) Select the adjustment address EE by the adjustment remote control and set the adjustment data to be 01.
5) Change the adjustment address in order to store the adjustment data. (3200K data fetch 1)
6) Select the adjustment address EE by the adjustment remote control and set the adjustment data to be 23.
7) Change the adjustment address in order to store the adjustment data. (3200K data fetch 2)
8) Check that the LANC data is changed and the adjustment address 95 is selected.
9) Select the adjustment address EE by the adjustment remote control and set the adjustment data to be 00.
10) Change the adjustment address in order to store the adjustment data.
11) Make auto white balance adjustment.

(2) Auto White Balance Adjustment (VC-67P Board)

Note 1 : Be sure to make this adjustment after preset adjustment.

Object	All white pattern
Filter	Color temperature compensation filter C14 (C12+C2)
Measuring instrument	Vectorscope
Measurement point	VIDEO OUT terminal
Adjustment page	F
Adjustment address	01 (R CONT) 02 (B CONT) 98 (START R) 99 (START B) 9A (R OUT DOOR) 9B (B OUT DOOR) A0 (Ra) A1 (Rb) A2 (Rc) A3 (Ba) A4 (Bb) A5 (Bc) A6 (R/B TOP) A7 (R/B MDL) A8 (R/B BTM) A9 (B/R TOP) AA (B/R MDL) AB (B/R BTM) B0 (TOP SLP R) B8 (TOP UP) B9 (TOP DWN) BD (R DWN LMT) BE (B DWN LMT) BF (B IN TOP) C0 (B IN MAX) C1 (B OUT MIN) C2 (B OUT DWN)
Specified value	The white and black bright points must coincide.

[Adjustment Method]

1) Select the adjustment page F with the adjustment remote control.
2) Select the adjustment address EE (AWB MODE1) with the adjustment remote control and enter the adjustment data 10. (Set of WB DIRECT)
3) Cover the lens with the C14 filter.
4) Change the adjustment data of the adjustment addresses 01 and 02 with the adjustment remote control to coincide the white bright point with the origin.
   At this time, assume the data of the adjustment address 01 as Rc14 and that of the adjustment address 02 as Bc14.
5) Input the value on the AWB adjustment data list (Refer to page 45) from the value of Rc14 and Bc14 to each address, and then proceed to the item 16). If the value does not come under the list, caluculate the adjustment data by the calculation from item 6).
6) Make that the adjustment address 01 data of the adjustment remote control on the item 4) is C1 and the adjustment address 02 data is C2.
7) Convert C_1 into a decimal number to assume it as C_1', and C_2 as well as C_2'. (Refer to Table 3-4 "Hexadecimal-Decimal Conversion Table")
8) Obtain D_{9A}' anb D_{9B}' by the following formula.
   $D_{9A}'=C_1'+2$ $D_{9B}'=C_2'+6$
9) Convert D_{9A}' and D_{9B}' into a hexadecimal number and assume its value as D_{9A} and D_{9B}. (Round fractions below a decimal number to the nearest whole number)
10) Select the adjustment address 9A and enter the adjustment data D_{9A}.
11) Select the adjustment address 9B and enter the adjustment data D_{9B}.
12) Obtain A and B in the hexadecimal numbers by the following formula, and convert them into the decimal numbers. The values are A′ and B′.
   $A=5A-D_{9A}$
   $B=D_{9B}-50$
13) Obtain the adjustment data of each adjustment address in the decimal numbers by the following formula.
   $D_{A0}'=90-A'\times1.12$
   $D_{A1}'=D_{9A}'$
   $D_{A2}'=90-A'\times0.593$
   $D_{98}'=D_{A2}'$
   $D_{BE}'=B'\times2+80$
   $D_{BF}'=D_{9B}'$
   $D_{C0}'=B'\times0.84+80$
   $D_{C1}'=D_{C0}'$
   $D_{C2}'=B'\times0.3+80$
   $D_{A3}'=B'\times1.34+80$
   $D_{99}'=D_{A5}'$
   $D_{A4}'=D_{9B}'$
   $D_{A5}'=B\times0.467+80$
   $D_{BD}=90-A'\times1.67$
14) The above items, calculate by decimal and input by hexadecimal.

15) The below items, calculate by hexadecimal and input the adjustment data to each adjustment address.

$$D_{A6}=\frac{(D_{A1}-D_{A0})\times 40}{(D_{A3}-D_{A4})}$$

$$D_{A7}=\frac{(D_{A2}-D_{A1})\times 40}{(D_{A4}-D_{A5})}$$

$$D_{A8}=\frac{(5A-D_{A2})\times 40}{(D_{A5}-50)}$$

$$D_{A9}=\frac{(D_{A3}-D_{A4})\times 10}{(D_{A1}-D_{A0})}$$

$$D_{AA}=\frac{(D_{A4}-D_{A5})\times 10}{(D_{A2}-D_{A1})}$$

$$D_{AB}=\frac{(D_{A5}-50)\times 10}{(5A-D_{A1})}$$

$$D_{B0}=D_{A9}$$

$$D_{B8}=\frac{(D_{A1}+0A)\times D_{B0}+D_{A4}\times 10}{40}$$

$$D_{B9}=\frac{(D_{A1}-11)\times D_{B0}+D_{A4}\times 10}{40}$$

16) Select the adjustment address EE and input the adjsutment data F0.
17) Change the adjustment addresses 01 and 02 with the adjustment remote control to coincide the white bright point with the origin.
18) Select the adjustment address EE and enter the adjustment data 00.
19) Change the adjustment address in order to store the adjustment data.

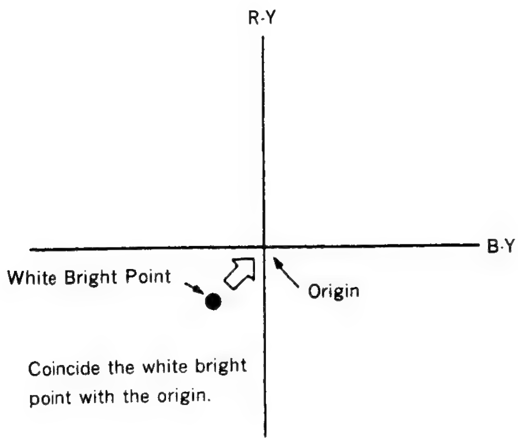


Fig. 3-34.

•AWB Adjustment Data Table

Rc14;Bc14	adr98	99	9A	9B	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	B0	B8	9	BD	BE	BF	C0	C1	C2
3D 78	4A	65	3F	7E	3C	3F	4A	8E	7E	65	C	1C	31	55	24	15	55	81	5D	2C	AC	7E	77	77	5E
3D 79	4A	66	3F	7F	3C	3F	4A	8F	7F	66	C	1C	2F	55	24	16	55	81	5D	2C	AE	7F	77	77	5E
3D 7A	4A	66	3F	80	3C	3F	4A	90	80	66	C	1B	2F	55	26	16	55	81	5D	2C	B0	80	78	78	5E
3D 7B	4A	67	3F	81	3C	3F	4A	92	81	67	B	1B	2D	5B	26	17	5B	88	61	2C	B2	81	79	79	5F
3D 7C	4A	67	3F	82	3C	3F	4A	93	82	67	B	1A	2D	5B	27	17	5B	88	62	2C	B4	82	7A	7A	5F
3D 7D	4A	68	3F	83	3C	3F	4A	94	83	68	B	1A	2B	5B	27	18	5B	88	62	2C	B6	83	7B	7B	5F
3D 7E	4A	68	3F	84	3C	3F	4A	96	84	68	B	19	2B	60	29	18	60	8F	66	2C	B8	84	7C	7C	60
3D 7F	4A	69	3F	85	3C	3F	4A	97	85	69	B	19	29	60	29	19	60	8F	66	2C	BA	85	7D	7D	60
3D 80	4A	69	3F	86	3C	3F	4A	98	86	69	B	18	29	60	2A	19	60	8F	67	2C	BC	86	7D	7D	60
3D 81	4A	6A	3F	87	3C	3F	4A	9A	87	6A	A	18	27	65	2A	1A	65	95	6B	2C	BE	87	7E	7E	61
3D 82	4A	6A	3F	88	3C	3F	4A	9B	88	6A	A	17	27	65	2C	1A	65	96	6B	2C	C0	88	7F	7F	61
3D 83	4A	6B	3F	89	3C	3F	4A	9C	89	6B	A	17	26	65	2C	1B	65	96	6B	2C	C2	89	80	80	61
3D 84	4A	6B	3F	8A	3C	3F	4A	9E	8A	6B	A	17	26	6B	2D	1B	6B	9C	6F	2C	C4	8A	81	81	61
3D 85	4A	6C	3F	8B	3C	3F	4A	9F	8B	6C	A	17	25	6B	2D	1C	6B	9C	6F	2C	C6	8B	82	82	62
3D 86	4A	6C	3F	8C	3C	3F	4A	A0	8C	6C	A	16	25	6B	2F	1C	6B	9D	70	2C	C8	8C	82	82	62
3D 87	4A	6C	3F	8D	3C	3F	4A	A2	8D	6C	9	15	25	70	30	1C	70	A3	74	2C	CA	8D	83	83	62
3D 88	4A	6D	3F	8E	3C	3F	4A	A3	8E	6D	9	15	23	70	30	1D	70	A3	74	2C	CC	8E	84	84	63
3D 89	4A	6D	3F	8F	3C	3F	4A	A4	8F	6D	9	15	23	70	31	1D	70	A4	74	2C	CE	8F	85	85	63
3D 8A	4A	6E	3F	90	3C	3F	4A	A6	90	6E	9	15	22	75	31	1E	75	AA	78	2C	D0	90	86	86	63
3D 8B	4A	6E	3F	91	3C	3F	4A	A7	91	6E	9	14	22	75	33	1E	75	AA	79	2C	D2	91	87	87	64
3E 78	4B	65	40	7E	3D	40	4B	8E	7E	65	C	1C	2E	55	24	16	55	82	5E	2E	AC	7E	77	77	5E
3E 79	4B	66	40	7F	3D	40	4B	8F	7F	66	C	1C	2C	55	24	17	55	82	5E	2E	AE	7F	77	77	5E
3E 7A	4B	66	40	80	3D	40	4B	90	80	66	C	1B	2C	55	26	17	55	83	5F	2E	B0	80	78	78	5E
3E 7B	4B	67	40	81	3D	40	4B	92	81	67	B	1B	2A	5B	26	19	5B	89	63	2E	B2	81	79	79	5F
3E 7C	4B	67	40	82	3D	40	4B	93	82	67	B	1A	2A	5B	27	19	5B	89	63	2E	B4	82	7A	7A	5F
3E 7D	4B	68	40	83	3D	40	4B	94	83	68	B	1A	28	5B	27	1A	5B	8A	63	2E	B6	83	7B	7B	5F
3E 7E	4B	68	40	84	3D	40	4B	96	84	68	B	19	28	60	29	1A	60	90	68	2E	B8	84	7C	7C	60
3E 7F	4B	69	40	85	3D	40	4B	97	85	69	B	19	26	60	29	1B	60	90	68	2E	BA	85	7D	7D	60
3E 80	4B	69	40	86	3D	40	4B	98	86	69	B	18	26	60	2A	1B	60	91	68	2E	BC	86	7D	7D	60
3E 81	4B	6A	40	87	3D	40	4B	9A	87	6A	A	18	25	65	2A	1C	65	97	6C	2E	BE	87	7E	7E	61
3E 82	4B	6A	40	88	3D	40	4B	9B	88	6A	A	17	25	65	2C	1C	65	97	6C	2E	C0	88	7F	7F	61
3E 83	4B	6B	40	89	3D	40	4B	9C	89	6B	A	17	24	65	2C	1D	65	97	6D	2E	C2	89	80	80	61
3E 84	4B	6B	40	8A	3D	40	4B	9E	8A	6B	A	17	24	6B	2D	1D	6B	9E	71	2E	C4	8A	81	81	61
3E 85	4B	6C	40	8B	3D	40	4B	9F	8B	6C	A	17	22	6B	2D	1E	6B	9E	71	2E	C6	8B	82	82	62
3E 86	4B	6C	40	8C	3D	40	4B	A0	8C	6C	A	16	22	6B	2F	1E	6B	9E	71	2E	C8	8C	82	82	62
3E 87	4B	6C	40	8D	3D	40	4B	A2	8D	6C	9	15	22	70	30	1E	70	A5	76	2E	CA	8D	83	83	62
3E 88	4B	6D	40	8E	3D	40	4B	A3	8E	6D	9	15	21	70	30	1F	70	A5	76	2E	CC	8E	84	84	63
3E 89	4B	6D	40	8F	3D	40	4B	A4	8F	6D	9	15	21	70	31	1F	70	A5	76	2E	CE	8F	85	85	63
3E 8A	4B	6E	40	90	3D	40	4B	A6	90	6E	9	15	20	75	31	20	75	AC	7A	2E	D0	90	86	86	63
3E 8B	4B	6E	40	91	3D	40	4B	A7	91	6E	9	14	20	75	33	20	75	AC	7A	2E	D2	91	87	87	64
3F 78	4B	65	41	7E	3E	41	4B	8E	7E	65	C	1A	2E	55	28	16	55	84	60	30	AC	7E	77	77	5E
3F 79	4B	66	41	7F	3E	41	4B	8F	7F	66	C	1A	2C	55	28	17	55	84	60	30	AE	7F	77	77	5E
3F 7A	4B	66	41	80	3E	41	4B	90	80	66	C	19	2C	55	2A	17	55	84	60	30	B0	80	78	78	5E
3F 7B	4B	67	41	81	3E	41	4B	92	81	67	B	19	2A	5B	2A	19	5B	8B	64	30	B2	81	79	79	5F
3F 7C	4B	67	41	82	3E	41	4B	93	82	67	B	18	2A	5B	2B	19	5B	8B	65	30	B4	82	7A	7A	5F
3F 7D	4B	68	41	83	3E	41	4B	94	83	68	B	18	28	5B	2B	1A	5B	8B	65	30	B6	83	7B	7B	5F
3F 7E	4B	68	41	84	3E	41	4B	96	84	68	B	17	28	60	2D	1A	60	92	69	30	B8	84	7C	7C	60
3F 7F	4B	69	41	85	3E	41	4B	97	85	69	B	17	26	60	2D	1B	60	92	69	30	BA	85	7D	7D	60
3F 80	4B	69	41	86	3E	41	4B	98	86	69	B	16	26	60	2E	1B	60	92	6A	30	BC	86	7D	7D	60
3F 81	4B	6A	41	87	3E	41	4B	9A	87	6A	A	16	25	65	2E	1C	65	99	6E	30	BE	87	7E	7E	61
3F 82	4B	6A	41	88	3E	41	4B	9B	88	6A	A	15	25	65	30	1C	65	99	6E	30	C0	88	7F	7F	61
3F 83	4B	6B	41	89	3E	41	4B	9C	89	6B	A	15	24	65	30	1D	65	99	6E	30	C2	89	80	80	61
3F 84	4B	6B	41	8A	3E	41	4B	9E	8A	6B	A	15	24	6B	32	1D	6B	A0	73	30	C4	8A	81	81	61
3F 85	4B	6C	41	8B	3E	41	4B	9F	8B	6C	A	15	22	6B	32	1E	6B	A0	73	30	C6	8B	82	82	62

Rc14	Bc14	adr98	99	9A	9B	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	B0	B8	L	BD	BE	BF	C0	C1	C2
3F	86	4B	6C	41	8C	3E	41	4B	A0	8C	6C	A	14	22	6B	33	1E	6B	A0	73	30	C8	8C	82	82	62
3F	87	4B	6C	41	8D	3E	41	4B	A2	8D	6C	9	13	22	70	35	1E	70	A7	77	30	CA	8D	83	83	62
3F	88	4B	6D	41	8E	3E	41	4B	A3	8E	6D	9	13	21	70	35	1F	70	A7	78	30	CC	8E	84	84	63
3F	89	4B	6D	41	8F	3E	41	4B	A4	8F	6D	9	13	21	70	36	1F	70	A7	78	30	CE	8F	85	85	63
3F	8A	4B	6E	41	90	3E	41	4B	A6	90	6E	9	13	20	75	36	20	75	AE	7C	30	D0	90	86	86	63
3F	8B	4B	6E	41	91	3E	41	4B	A7	91	6E	9	12	20	75	38	20	75	AE	7C	30	D2	91	87	87	64
40	78	4C	65	42	7E	3F	42	4C	8E	7E	65	C	1A	2B	55	28	18	55	85	61	31	AC	7E	77	77	5E
40	79	4C	66	42	7F	3F	42	4C	8F	7F	66	C	1A	29	55	28	19	55	85	61	31	AE	7F	77	77	5E
40	7A	4C	66	42	80	3F	42	4C	90	80	66	C	19	29	55	2A	19	55	85	61	31	B0	80	78	78	5E
40	7B	4C	67	42	81	3F	42	4C	92	81	67	B	19	27	5B	2A	1A	5B	8C	66	31	B2	81	79	79	5F
40	7C	4C	67	42	82	3F	42	4C	93	82	67	B	18	27	5B	2B	1A	5B	8C	66	31	B4	82	7A	7A	5F
40	7D	4C	68	42	83	3F	42	4C	94	83	68	B	18	25	5B	2B	1B	5B	8C	66	31	B6	83	7B	7B	5F
40	7E	4C	68	42	84	3F	42	4C	96	84	68	B	17	25	60	2D	1B	60	93	6B	31	B8	84	7C	7C	60
40	7F	4C	69	42	85	3F	42	4C	97	85	69	B	17	24	60	2D	1D	60	93	6B	31	BA	85	7D	7D	60
40	80	4C	69	42	86	3F	42	4C	98	86	69	B	16	24	60	2E	1D	60	94	6B	31	BC	86	7D	7D	60
40	81	4C	6A	42	87	3F	42	4C	9A	87	6A	A	16	22	65	2E	1E	65	9A	6F	31	BE	87	7E	7E	61
40	82	4C	6A	42	88	3F	42	4C	9B	88	6A	A	15	22	65	30	1E	65	9A	70	31	C0	88	7F	7F	61
40	83	4C	6B	42	89	3F	42	4C	9C	89	6B	A	15	21	65	30	1F	65	9B	70	31	C2	89	80	80	61
40	84	4C	6B	42	8A	3F	42	4C	9E	8A	6B	A	15	21	6B	32	1F	6B	A1	74	31	C4	8A	81	81	61
40	85	4C	6C	42	8B	3F	42	4C	9F	8B	6C	A	15	20	6B	32	20	6B	A1	74	31	C6	8B	82	82	62
40	86	4C	6C	42	8C	3F	42	4C	A0	8C	6C	A	14	20	6B	33	20	6B	A2	75	31	C8	8C	82	82	62
40	87	4C	6C	42	8D	3F	42	4C	A2	8D	6C	9	13	20	70	35	20	70	A8	79	31	CA	8D	83	83	62
40	88	4C	6D	42	8E	3F	42	4C	A3	8E	6D	9	13	1F	70	35	21	70	A9	79	31	CC	8E	84	84	63
40	89	4C	6D	42	8F	3F	42	4C	A4	8F	6D	9	13	1F	70	36	21	70	A9	7A	31	CE	8F	85	85	63
40	8A	4C	6E	42	90	3F	42	4C	A6	90	6E	9	13	1E	75	36	22	75	AF	7E	31	D0	90	86	86	63
40	8B	4C	6E	42	91	3F	42	4C	A7	91	6E	9	12	1E	75	38	22	75	B0	7E	31	D2	91	87	87	64
41	78	4C	65	43	7E	40	43	4C	8E	7E	65	C	17	2B	55	2C	18	55	86	62	33	AC	7E	77	77	5E
41	79	4C	66	43	7F	40	43	4C	8F	7F	66	C	17	29	55	2C	19	55	86	62	33	AE	7F	77	77	5E
41	7A	4C	66	43	80	40	43	4C	90	80	66	C	16	29	55	2E	19	55	87	63	33	B0	80	78	78	5E
41	7B	4C	67	43	81	40	43	4C	92	81	67	B	16	27	5B	2E	1A	5B	8D	67	33	B2	81	79	79	5F
41	7C	4C	67	43	82	40	43	4C	93	82	67	B	15	27	5B	30	1A	5B	8E	67	33	B4	82	7A	7A	5F
41	7D	4C	68	43	83	40	43	4C	94	83	68	B	15	25	5B	30	1B	5B	8E	68	33	B6	83	7B	7B	5F
41	7E	4C	68	43	84	40	43	4C	96	84	68	B	15	25	60	32	1B	60	95	6C	33	B8	84	7C	7C	60
41	7F	4C	69	43	85	40	43	4C	97	85	69	B	15	24	60	32	1D	60	95	6C	33	BA	85	7D	7D	60
41	80	4C	69	43	86	40	43	4C	98	86	69	B	14	24	60	34	1D	60	95	6D	33	BC	86	7D	7D	60
41	81	4C	6A	43	87	40	43	4C	9A	87	6A	A	14	22	65	34	1E	65	9C	71	33	BE	87	7E	7E	61
41	82	4C	6A	43	88	40	43	4C	9B	88	6A	A	13	22	65	35	1E	65	9C	71	33	C0	88	7F	7F	61
41	83	4C	6B	43	89	40	43	4C	9C	89	6B	A	13	21	65	35	1F	65	9C	71	33	C2	89	80	80	61
41	84	4C	6B	43	8A	40	43	4C	9E	8A	6B	A	13	21	6B	37	1F	6B	A3	76	33	C4	8A	81	81	61
41	85	4C	6C	43	8B	40	43	4C	9F	8B	6C	A	13	20	6B	37	20	6B	A3	76	33	C6	8B	82	82	62
41	86	4C	6C	43	8C	40	43	4C	A0	8C	6C	A	12	20	6B	39	20	6B	A3	76	33	C8	8C	82	82	62
41	87	4C	6C	43	8D	40	43	4C	A2	8D	6C	9	11	20	70	3B	20	70	AA	7B	33	CA	8D	83	83	62
41	88	4C	6D	43	8E	40	43	4C	A3	8E	6D	9	11	1F	70	3B	21	70	AA	7B	33	CC	8E	84	84	63
41	89	4C	6D	43	8F	40	43	4C	A4	8F	6D	9	11	1F	70	3C	21	70	AB	7B	33	CE	8F	85	85	63
41	8A	4C	6E	43	90	40	43	4C	A6	90	6E	9	11	1E	75	3C	22	75	B1	80	33	D0	90	86	86	63
41	8B	4C	6E	43	91	40	43	4C	A7	91	6E	9	10	1E	75	3E	22	75	B1	80	33	D2	91	87	87	64
42	78	4D	65	44	7E	41	44	4D	8E	7E	65	C	17	28	55	2C	1A	55	88	64	35	AC	7E	77	77	5E
42	79	4D	66	44	7F	41	44	4D	8F	7F	66	C	17	26	55	2C	1B	55	88	64	35	AE	7F	77	77	5E
42	7A	4D	66	44	80	41	44	4D	90	80	66	C	16	26	55	2E	1B	55	88	64	35	B0	80	78	78	5E
42	7B	4D	67	44	81	41	44	4D	92	81	67	B	16	24	5B	2E	1C	5B	8F	69	35	B2	81	79	79	5F
42	7C	4D	67	44	82	41	44	4D	93	82	67	B	15	24	5B	30	1C	5B	8F	69	35	B4	82	7A	7A	5F
42	7D	4D	68	44	83	41	44	4D	94	83	68	B	15	23	5B	30	1E	5B	8F	69	35	B6	83	7B	7B	5F
42	7E	4D	68	44	84	41	44	4D	96	84	68	B	15	23	60	32	1E	60	96	6E	35	B8	84	7C	7C	60
42	7F	4D	69	44	85	41	44	4D	97	85	69	B	15	21	60	32	1F	60	96	6E	35	BA	85	7D	7D	60

Rc14;Bc14		adr98	99	9A	9B	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	B0	B8	B9	BD	BE	BF	C0	C1	C2
42	80	4D	69	44	86	41	44	4D	98	86	69	B	14	21	60	34	1F	60	97	6E	35	BC	86	7D	7D	60
42	81	4D	6A	44	87	41	44	4D	9A	87	6A	A	14	20	65	34	20	65	9D	73	35	BE	87	7E	7E	61
42	82	4D	6A	44	88	41	44	4D	9B	88	6A	A	13	20	65	35	20	65	9E	73	35	C0	88	7F	7F	61
42	83	4D	6B	44	89	41	44	4D	9C	89	6B	A	13	1F	65	35	21	65	9E	73	35	C2	89	80	80	61
42	84	4D	6B	44	8A	41	44	4D	9E	8A	6B	A	13	1F	6B	37	21	6B	A5	78	35	C4	8A	81	81	61
42	85	4D	6C	44	8B	41	44	4D	9F	8B	6C	A	13	1E	6B	37	22	6B	A5	78	35	C6	8B	82	82	62
42	86	4D	6C	44	8C	41	44	4D	A0	8C	6C	A	12	1E	6B	39	22	6B	A5	78	35	C8	8C	82	82	62
42	87	4D	6C	44	8D	41	44	4D	A2	8D	6C	9	11	1E	70	3B	22	70	AC	7D	35	CA	8D	83	83	62
42	88	4D	6D	44	8E	41	44	4D	A3	8E	6D	9	11	1D	70	3B	24	70	AC	7D	35	CC	8E	84	84	63
42	89	4D	6D	44	8F	41	44	4D	A4	8F	6D	9	11	1D	70	3C	24	70	AC	7D	35	CE	8F	86	85	63
42	8A	4D	6E	44	90	41	44	4D	A6	90	6E	9	11	1C	75	3C	25	75	B3	82	35	D0	90	86	86	63
42	8B	4D	6E	44	91	41	44	4D	A7	91	6E	9	10	1C	75	3E	25	75	B3	82	35	D2	91	87	87	64
43	78	4E	65	45	7E	42	45	4E	8E	7E	65	C	17	25	55	2C	1C	55	89	65	36	AC	7E	77	77	5E
43	79	4E	66	45	7F	42	45	4E	8F	7F	66	C	17	23	55	2C	1D	55	89	65	36	AE	7F	77	77	5E
43	7A	4E	66	45	80	42	45	4E	90	80	66	C	16	23	55	2E	1D	55	89	65	36	B0	80	78	78	5E
43	7B	4E	67	45	81	42	45	4E	92	81	67	B	16	21	5B	2E	1F	5B	90	6A	36	B2	81	79	79	5F
43	7C	4E	67	45	82	42	45	4E	93	82	67	B	15	21	5B	30	1F	5B	90	6A	36	B4	82	7A	7A	5F
43	7D	4E	68	45	83	42	45	4E	94	83	68	B	15	20	5B	30	20	5B	91	6A	36	B6	83	7B	7B	5F
43	7E	4E	68	45	84	42	45	4E	96	84	68	B	15	20	60	32	20	60	98	6F	36	B8	84	7C	7C	60
43	7F	4E	69	45	85	42	45	4E	97	85	69	B	15	1F	60	32	21	60	98	6F	36	BA	85	7D	7D	60
43	80	4E	69	45	86	42	45	4E	98	86	69	B	14	1F	60	34	21	60	98	70	36	BC	86	7D	7D	60
43	81	4E	6A	45	87	42	45	4E	9A	87	6A	A	14	1E	65	34	23	65	9F	74	36	BE	87	7E	7E	61
43	82	4E	6A	45	88	42	45	4E	9B	88	6A	A	13	1E	65	35	23	65	9F	74	36	C0	88	7F	7F	61
43	83	4E	6B	45	89	42	45	4E	9C	89	6B	A	13	1C	65	35	24	65	9F	75	36	C2	89	80	80	61
43	84	4E	6B	45	8A	42	45	4E	9E	8A	6B	A	13	1C	6B	37	24	6B	A6	79	36	C4	8A	81	81	61
43	85	4E	6C	45	8B	42	45	4E	9F	8B	6C	A	13	1B	6B	37	25	6B	A6	79	36	C6	8B	82	82	62
43	86	4E	6C	45	8C	42	45	4E	A0	8C	6C	A	12	1B	6B	39	25	6B	A7	7A	36	C8	8C	82	82	62
43	87	4E	6C	45	8D	42	45	4E	A2	8D	6C	9	11	1B	70	3B	25	70	AE	7E	36	CA	8D	83	83	62
43	88	4E	6D	45	8E	42	45	4E	A3	8E	6D	9	11	1A	70	3B	27	70	AE	7F	36	CC	8E	84	84	63
43	89	4E	6D	45	8F	42	45	4E	A4	8F	6D	9	11	1A	70	3C	27	70	AE	7F	36	CE	8F	85	85	63
43	8A	4E	6E	45	90	42	45	4E	A6	90	6E	9	11	1A	75	3C	28	75	B5	83	36	D0	90	86	86	63
43	8B	4E	6E	45	91	42	45	4E	A7	91	6E	9	10	1A	75	3E	28	76	B5	84	36	D2	91	87	87	64
44	78	4E	65	46	7E	44	46	4E	8E	7E	65	8	14	25	80	32	1C	80	C0	8A	38	AC	7E	77	77	5E
44	79	4E	66	46	7F	44	46	4E	8F	7F	66	8	14	23	80	32	1D	80	C0	8A	38	AE	7F	77	77	5E
44	7A	4E	66	46	80	44	46	4E	90	80	66	8	14	23	80	34	1D	80	C0	8A	38	B0	80	78	78	5E
44	7B	4E	67	46	81	44	46	4E	92	81	67	8	14	21	88	34	1F	88	CA	91	38	B2	81	79	79	5F
44	7C	4E	67	46	82	44	46	4E	93	82	67	8	13	21	88	36	1F	88	CB	91	38	B4	82	7A	7A	5F
44	7D	4E	68	46	83	44	46	4E	94	83	68	8	13	20	88	36	20	88	CB	91	38	B6	83	7B	7B	5F
44	7E	4E	68	46	84	44	46	4E	96	84	68	7	12	20	90	38	20	90	D5	98	38	B8	84	7C	7C	60
44	7F	4E	69	46	85	44	46	4E	97	85	69	7	12	1F	90	38	21	90	D5	99	38	BA	85	7D	7D	60
44	80	4E	69	46	86	44	46	4E	98	86	69	7	12	1F	90	3A	21	90	D6	99	38	BC	86	7D	7D	60
44	81	4E	6A	46	87	44	46	4E	9A	87	6A	7	12	1E	98	3A	23	98	E0	A0	38	BE	87	7E	7E	61
44	82	4E	6A	46	88	44	46	4E	9B	88	6A	7	11	1E	98	3C	23	98	E0	A0	38	C0	88	7F	7F	61
44	83	4E	6B	46	89	44	46	4E	9C	89	6B	7	11	1C	98	3C	24	98	E0	A0	38	C2	89	80	80	61
44	84	4E	6B	46	8A	44	46	4E	9E	8A	6B	6	11	1C	A0	3E	24	A0	EB	A7	38	C4	8A	81	81	61
44	85	4E	6C	46	8B	44	46	4E	9F	8B	6C	6	11	1B	A0	3E	25	A0	EB	A7	38	C6	8B	82	82	62
44	86	4E	6C	46	8C	44	46	4E	A0	8C	6C	6	10	1B	A0	40	25	A0	EB	A8	38	C8	8C	82	82	62
44	87	4E	6C	46	8D	44	46	4E	A2	8D	6C	6	10	1B	A8	42	25	A8	F5	AE	38	CA	8D	83	83	62
44	88	4E	6D	46	8E	44	46	4E	A3	8E	6D	6	10	1A	A8	42	27	A8	F6	AF	38	CC	8E	84	84	63
44	89	4E	6D	46	8F	44	46	4E	A4	8F	6D	6	F	1A	A8	44	27	A8	F6	AF	38	CE	8F	85	85	63
44	8A	4E	6E	46	90	44	46	4E	A6	90	6E	6	F	1A	B0	44	28	B0	100	B6	38	D0	90	86	86	63
44	8B	4E	6E	46	91	44	46	4E	A7	91	6E	6	F	1A	B0	46	28	B0	100	B6	38	D2	91	87	87	64

3-3-29. Outdoor White Balance Check

Object	White pattern standard picture frame
Filter	Color temperature compensation filter C14 (C12+C2)
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Specified value	Refer to Fig 3-35.

[Check Method]

1) Press the White Balance button to select the outdoor white balance mode. (A mark "☼" appears on the EVF screen or monitor screen (when the data screen is turned on)).
2) Check that the center of the white bright point is within the circumference shown in Fig. 3-35.

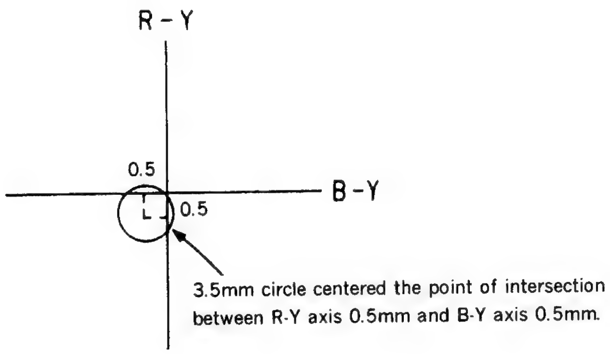


Fig. 3-35.

3-3-30. Focus Motor Speed Adjustment (AF-54P Board)

Object	Optional
Measurement point	Focus ring
Measuring instrument	Stopwatch
Adjustment page	F
Adjustment address	30 (LOW F SPEED)
Specified value	2.5±0.1 second

Reference: A rotation time is about 2.5 seconds from the focusing ring short distance end to long distance end after completing adjustment.

[Adjustment Method]

1) Press the FOCUS button (CK-20P board S673) to turn on auto focus.
2) Select the adjustment address EB with the adjustment remote control and enter adjustment data 01. (setting of the hunting mode)
3) Set the adjustment address to 30.
4) A rotation time is about 2.5 seconds from the focusing ring short distance end to long distance end.
5) Repeat the step 4) 10 times and obtain an average value. Specified value=2.5±0.1 second.
   When the specified value is not met, repeat the step and 4).
6) Set the adjustment address to EB and the adjustment data to 00. (cancellation of the hunting mode)
7) Change the adjustment address in order to store the adjustment data.

3-3-31. Macro Area Adjustment (AF-54P Board)

Object	Optional
Measurement point	CN801
Measuring instrument	AF microcomputer data reader jig (AF jig)
Adjustment page	F
Adjustment address	37 (ZOOM-POSI 4)
Specified value	AF microcomputer data reader jig data : H+4

[Adjustment Method]

1) Set the zoom ring at the WIDE end.
2) Select the adjustment page F with the adjustment remote control.
3) Select the adjustment address EB with the adjustment remote control and set the adjustment data to C3.
4) Set the adjustment address 37 with the adjustment remote control, an note down the data of the AF jig. (This data is H.)
5) Input the value of (H+4) to the adjustment data.
6) Change the adjustment address to EB and set the adjustment data to 00.
7) Change the adjustment address in order to store the adjustment data.
   (Example)

AF microcomputer data jig		Input value
07	⟶	0B
06	⟶	0A
⋮		⋮

3-3-32. Auto Focus Adjustment

(1) Preparation for AF Data Entry (AF-54P Board)

Object	All black (Cover the lens with a black cap), all white pattern
Measurement point	CN801
Measuring instrument	AF microcomputer data reader jig (AF jig)
Adjustment page	F
Adjustment address	2B (FH BM) 29 (FA BM) 46 (AGC B) 2A (FH WM) 45 (AGC W)
Specified value	FH WM≦28

[Adjustment Method]

1) Turn off auto focus with the FOCUS button (CK-20P board S673).
2) Cover the lens with a black cap.
3) Select the adjustment page F with the adjustment remote control.
4) Select the adjustment address EB with the adjustment remote control and set the adjustment data to ED.
5) Read the AF microcomputer data reader jig add +3 and enter this data (FH BM) to the adjustment address 2B.
6) Select the adjustment address EB and set the adjustment data to EF.
7) Read the AF microcomputer data reader jig add +3 and enter this data (FA BM) to the adjustment address 29.
8) Select the adjustment address EB and set the adjustment data 0B.
9) Read the AF microcomputer data reader jig and enter this data (AGC B) to the adjustment address 46.
10) Remove the black cap from the lens and pick up an image with a white pattern (pattern box).
    (When this is done, check that the white diffusion plate for the pattern box is not dirty.)
11) Select the adjustment address EB and set the adjustment data to ED.
12) Read the AF microcomputer data reader jig and enter this data (FH WM) to the adjustment address 2A. (FH WM≦28)
13) Select the adjustment address EB and set the adjustment data to 0B.
14) Read the AF microcomputer data reader jig and enter this data (AGC W) to the adjustment address 45.
15) Select the adjustment address EB and set the adjustment data to 00.
16) Change the adjustment address in order to store the adjustment data.

(2) Auto Focus Check (AF-54P Board)

Object	Siemens star (1.5m in front of the lens datum level (marked by "ϕ"))
Filter	ND filter 1.0×1 pcs., 0.1×2 pcs.
Measurement point	Focus ring
Measuring instrument	Focus ring
Specified values	The focus ring stops at 2 to 3 of the index.

[Measurement method]

1) Place a Siemens star at 1.5m from the lens standard surface (See to Fig. 3-2)
2) Set the zoom lever to the TELE end (68mm) and turn off the auto focus with the FOCUS button (CK-20P board S673).

3) Adjust the camera position so that the center of the Siemens star on the monitor is correspond to the center of the screen.
4) Cover the lens with the ND filter 1.2.
5) Set the focus ring at short range end (1.1m). Make a picture of the Siemens star in the standard frame and turn on the auto focus with the FOCUS button.
6) After 2.0 seconds, confirm that the picture of Siemens star is taken clearly. Turn off the auto focus with the focus button.

Note : In the case of New microcomputer (after MC68HC11E9-SC400188), perform the following adjustment method.

1) Cover the lens with black cap and make all black.
2) Set the zoom lever to the WIDE end, and turn off the auto focus with the focus button.
3) Set the focus ring to ∞ and turn on the auto focus.
4) Confirm that the focus ring stops within the range of index 2 to 3.

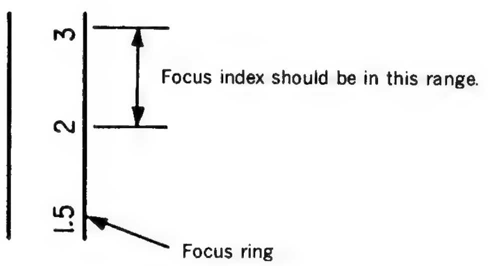


Fig. 3-36

3-3-33. Auto Focus Measuring distance Check

Object	Siemens star (at a distance of 1.5m in front of the lens datum level (marked by "ϕ"))

Note 1 : Connect the EVF (Electronic View Finder) to make adjustment.

[Measurement Methed]

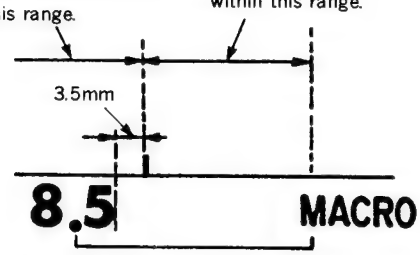
1) Place the Siemens star at a distance of 1.5m in front of the lens datum level (refer to Fig.3-2).
2) Cover the ND filter 1.2.
3) Shift the zoom lever to the TELE end (68mm).
4) Adjust a camera block position to center the Siemens star on the monitor screen with the monitor screen.
5) Turn off auto focus with the FOCUS button (CK-20P board S673).
6) Turn the focusing ring as far as the short distance end (1.1m).
7) Press the PUSH AUTO button (CK-20P board S674).
8) After 2 seconds, check that a clear image can be obtained.
9) Turn off auto focus and turn the focusing ring as far as the long distance end (∞).
10) Press the PUSH AUTO button.
11) After 3 seconds, check that a clear image can be obtained.

3-3-34. AF-Zooming Check

Object	All white pattern
Measurement point	Lens focusing ring or zoom ring
Specified value	Refer Fig. 3-37.

[Checking Method]

1) Obtain a picture of all white pattern by the WIDE end. And check that turning off and on the auto focus with the FOCUS switch (CK-20P board S673) permits the operation of both ends of the short distance end (1.1m) and the long distance end (on) over one operation.
2) After setting the Zoom lever in the MACRO range as shown in the figure, check that the focus ring does not move when the focus switch is turned ON and OFF, and turned ON again.



(After pushing fully the zoom lever to the MACRO point, put it back to the position in the figure.)

Fig. 3-37.

3-4. DIGITAL TITLER SYSTEM ADJUSTMENT

3-4-1. Chroma Phase/Gain Adjustment (CT-21P Board)

Mode	CAMERA Standby
Object	All Black (Cover the lens with a black cap.)
Measurement point	VIDEO OUT terminal
Measuring instrument	Vectorscope
Adjustment element	RV702
Specified value	Adjust Mg (Magenta) to the specified range. (Check that other colors are also in the specified range.)

[Measurement Method]

1) Press the SUPERIMPOSE TITLE 1 button (DK-5P board S950).
2) Press the COLOR/MODE button (DK-5P board S952) and select Mg(Magenta).
3) Cover the lens with black cap.
4) Press MEMORY button (DK-5P board S953) and display the all title.
5) At this time, the specified value should be satisfied.
6) After the adjustment, make R (red), Y_L (yellow), G (green), Cy (Cyan), B (blue), and check that the specified balue is satisfied.

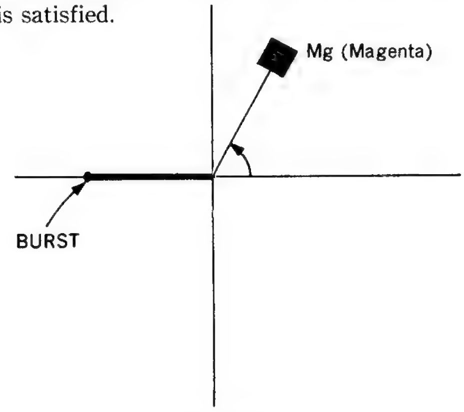


Fig. 3-38.

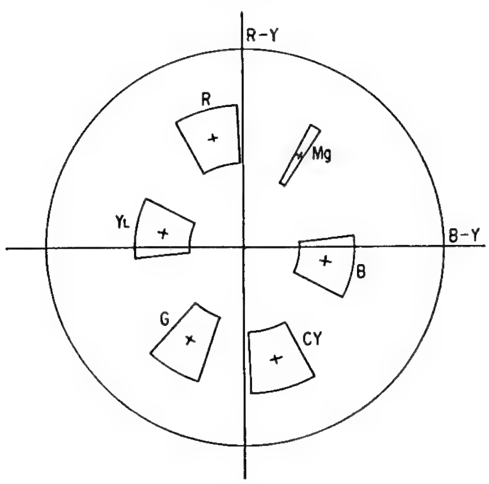


Fig. 3-39.

3-4-2. Fader Level Adjustment (VC-67P Board)

Object	All black (Cover the lens with a black cap)
Measurement point	Checkpoint array (A8) pin (CAM Y) or CN307 pin ① (Y OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	1D (FADER LEVEL) 1F (FADER CONT)
Specified value	240±5mVp-p

[Adjustment Method]

1) Select the adjustment page F with the adjustment remote control.
2) Select the adjustment address 1F with the adjustment remote control and pre-set the adjustment data to FF.
3) Set the adjustment address to 1D with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control to adjust the fader level to 240±5mVp-p.
5) Select the adjustment address 1F with the adjustment remote control and set the adjustment data to 00.
6) Change the adjustment address in order to store the adjustment data.

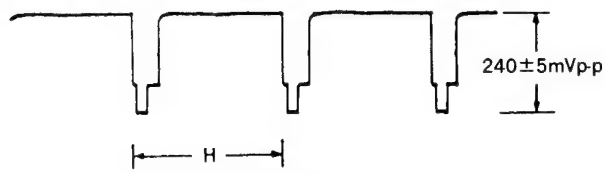
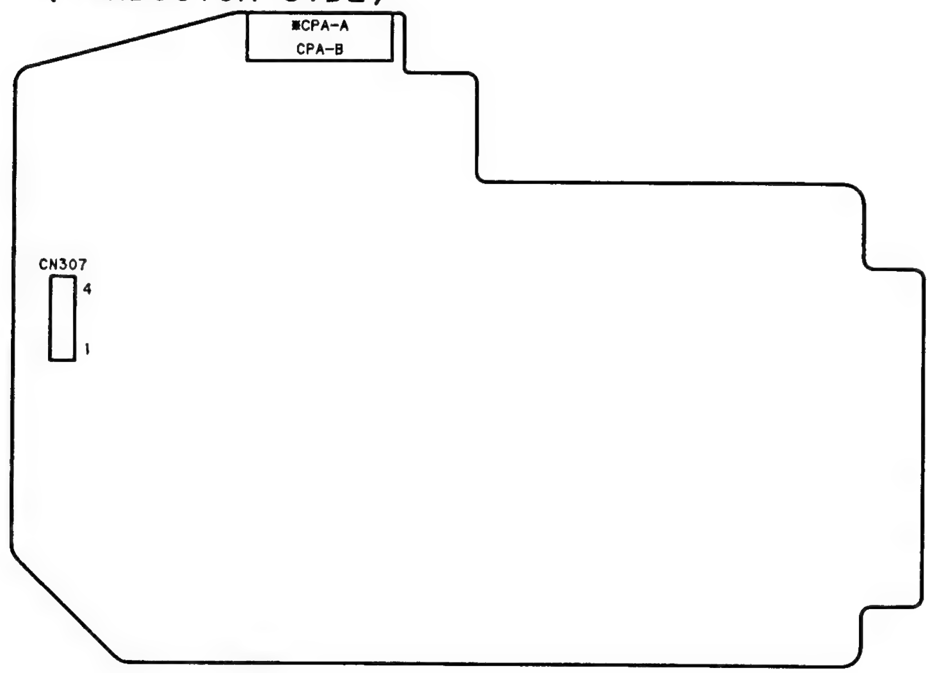


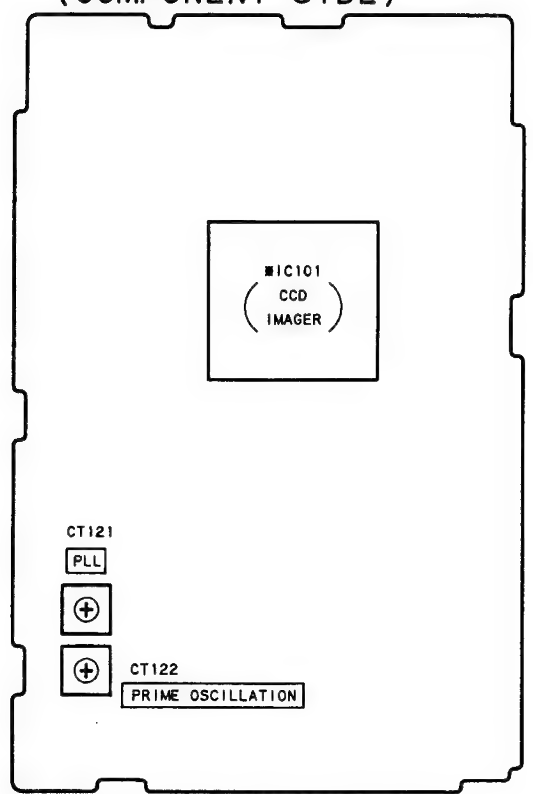
Fig. 3-40.

3-5. ADJUSTING PART LOCATION DIAGRAM

VC-67P BOARD
(CONDUCTOR SIDE)

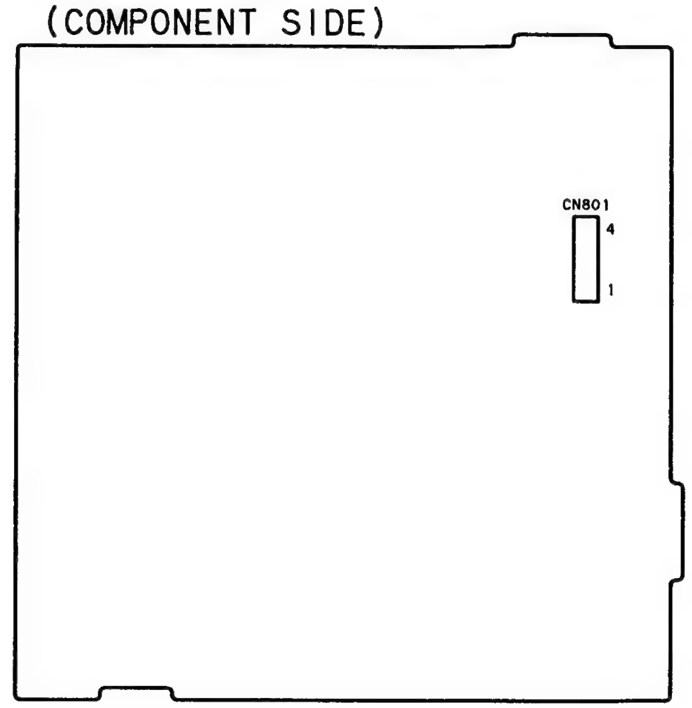


CD-20P BOARD
(COMPONENT SIDE)



*: Indicates a adjustment element
mounted on the conductor side.

AF-54P BOARD
(COMPONENT SIDE)



SECTION 4
ELECTRICAL ADJUSTMENT (VIDEO SYSTEM)

See the adjusting part location diagram from on page 82 for the adjustment.

4-1. PREPARATION FOR ADJUSTMENT

4-1-1. Equipment Required

The following measuring instruments are needed in adjusting the VTR section.

1) Monitor TV
2) Oscilloscope Dual-trace, Bandwidth more than 10MHz with delay mode (Use a probe of 10 : 1, unless otherwise specified.)
3) Frequency counter
4) Pattern generator (with video output terminal)
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuator
10) Stabilized power supply
11) Alignment tape
    For tracking adjustment (WR5-1CP)*1
      Part number : 8-967-995-07
    For video frequency characteristics adjustment (WR5-6C)*2
      Part number : 8-967-995-17
    For operation check (WR5-4CL)*3
      Part number : 8-967-995-56
    For operation check (WR5-5CSP)*4
      Part number : 8-967-995-47

Note : ∗ 1 : WR5-1C(8-967-995-06)
∗ 2 : WR5-2C (8-967-995-16)
∗ 3 : WR5-3CL (8-967-995-36)
∗ 4 : WR5-3CSP(8-967-995-27)
WR5-4CSP (8-967-995-46)
} You can use these tape.

12) Adjustment remote control (RM-95 Partially remodeled product)

4-1-2. Precaution for Adjustment

The video section can be also adjusted without the camera section. Remove the camera section by disconnecting the following 5 connectors.

1. VC-67P board CN305
2. DC-DC converter 3P connecter (connect the FU-72P board W991)
3. VC-67P board CN307
4. VC-67P board CN306
5. SS-100P board CN503

Remove the EVF section by disconnecting the following connector.

1. VA-46P board CN601

MIC board (MC-44P board) is not necessary for video section adjustment. Remove the MIC board by disconnecting the following connector.

1. VA-46P board CN401

4-1-3. Equipment Connection

Unless otherwise specified, adjustment is made in the VTR mode by connecting the measuring instruments as shown in the figure below.

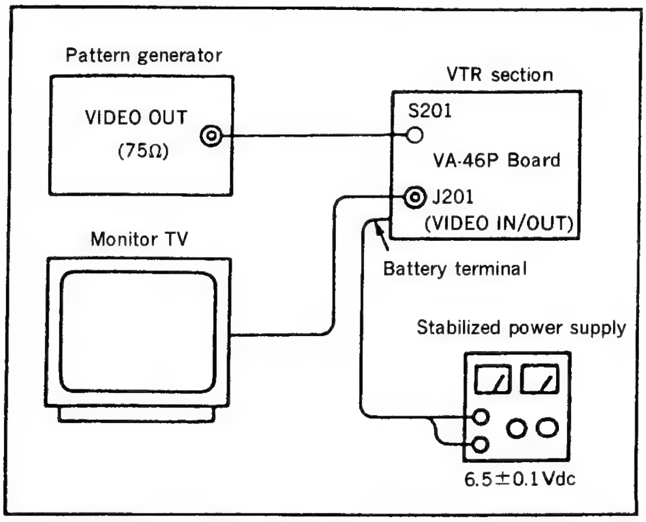


Fig. 4-1.

4-1-4. Setting up for Adjustment

Video signals output from a pattern generator are used as adjustment signals when adjusting the video section, and these video output signals should be within the required standard. Connect an oscilloscope to J201 (VIDEO IN/OUT) on theVA-46P board. Confirm that the amplitudes of video signal SYNC signals, of picture portions, and of burst signals are flat at approximately 0.3, 0.7, and 0.3V respectively, and that the level ratio of the burst signals and "red" signals are 0.30 : 0.66. Fig. 4-2 shows video signals (color burst) used in the video section adjustments.

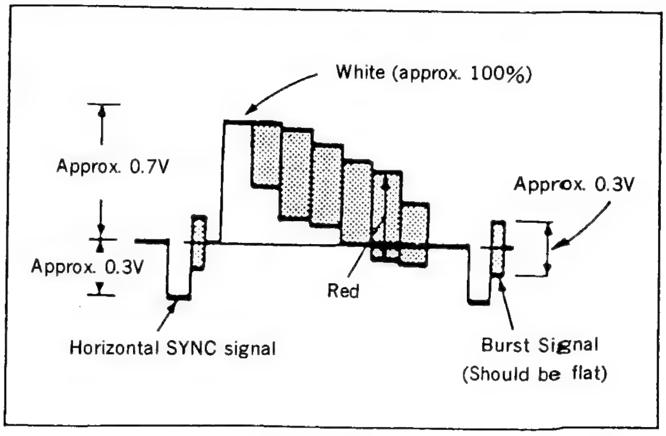
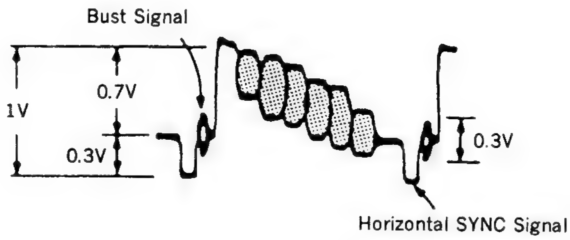
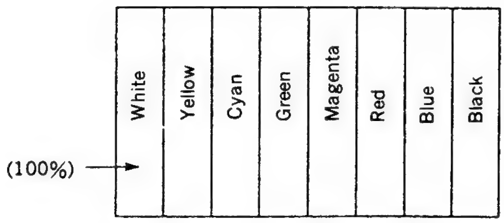


Fig. 4-2.

4-1-5. Alignment tape

Tape	Description	Use for
Tracking (WR5-ICP)	1. Recording area PCM—Video 2. Recording content : CH2 : 1MHz linearity adjustment signal (CH1 : 9MHz)	Drum linearity adjustment
Video frequency characteristic (WR5-6C)	1. Recording area Video 2. Recording content RF sweep 0 to 10MHz 3. Marker 1, 3.58, 5.5 and 7MHz	Frequency characteristic adjustment
Operation cheking SP mode (WR5-5CSP) LP mode (WR5-4CL) Note : PCM area is not included in WR5-4CL	1. Recording area Video 2. Recording content ■ Video area ● Video signals Color bar : 4min. Monoscope : 4min. (Color bars)   ● Audio signal (AFM) 400Hz, 60% modulation ■ PCM track (WR5-5CSP only) ● Audio signal (PCM) 1kHz, ...4 min. (color bar section) 20Hz, ...20 sec. 400Hz, ...20 sec. Iterative 14kHz. . . . . .20 sec.	Operation checking

4-1-6. Input/Output Level and impedance

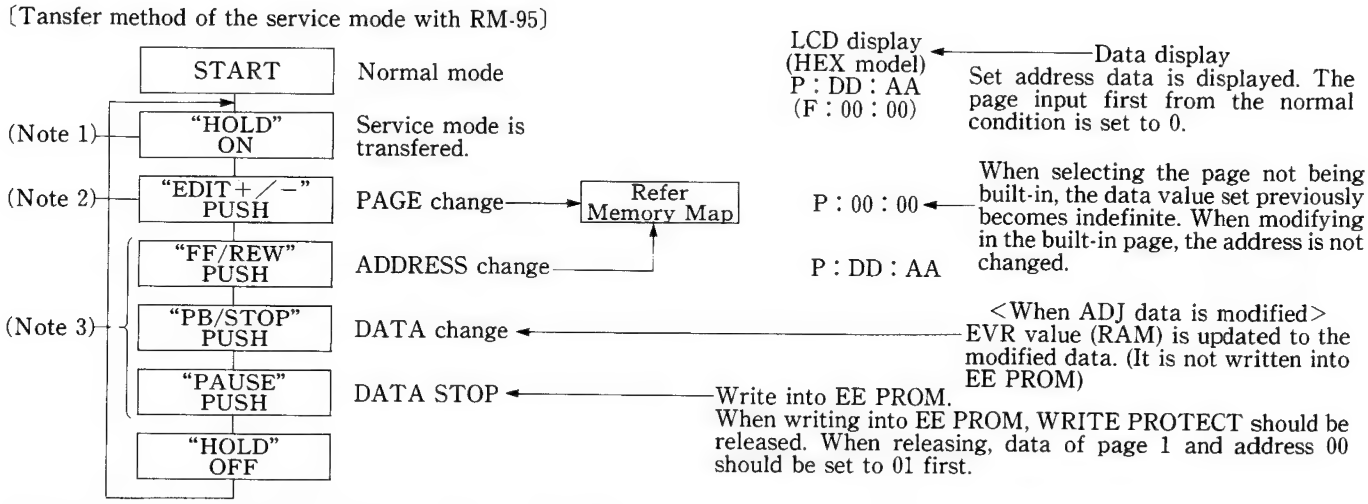
Video input/output Phono jack
Output signal: 1Vp-p, 75Ω unbalance, sync negative

Audio input/output Phono jack
Specified output : —10dBs (47Ω at load)
Impedance : 2.2kΩ or less

(AEP/UK Model → Output only
E/Australian Model → Input/output)

4-1-7. Service Mode

〔Tansfer method of the service mode with RM-95〕



Command name	Command function	Function Button with RM-95
Page Up	Page+ 1	Edit Search+
Page Down	Page− 1	Edit Search−
Direct Page Set	Set to direct page	Event Clear
Address Up	Address+1	Fast Forward
Address Down	Address−1	Rewind
Data Up	Data+ 1	Play Back
Data Down	Data−1	Stop
Store	Write data into EEPROM. RAM	Pause

[ADJUST, TEST MODE description]

MODE		PAGE/DATA/ADDRESS	Contents
ADJUST	Switching Position Adjustment	D : -- : 04 (high) D : -- : 05 (low)	Switching position adjustment See to page 65 for details
ADJUST	Battery Down Adjust-ment	D : -- : 06 (Sensor value) D : -- : 07 (Set value)	Use for battery down adjustment See to page 64 for details
TEST MODE	Pass Adjustment Truck Shift	1 : 30 : 4D	Truck shift for pass adjustment Set to the data described left and set the playback mode.
TEST MODE	Emergency Inhibit	1 : 10 : 4D	Detection of emergency is inhibited. Even if battery is ended, power is not turned off. SP/LP is not automatically distinguished. Emergency detection except for TAPE/TOP•END is inhibited.
TEST MODE	Emergency Code	D : -- : 20～22 D : -- : 24～26	First emergency is displayed. Last emergency is displayed. (※ See to 1) (IC501 μPD75312GF-018 and 024 are not displayed.)
TEST MODE	RECOG SW Check	1 : -- : 3D 1 : -- : 3E	Mode switch position is displayed. RECOG SW ON OFF is displayed. (※ See to 2)
TEST MODE	Function SW Check	1 : -- : E8～ED	Pressing KEY is checked. (※ See to 3)
TEST MODE	Motor single check	3 : 10 : DD (Loading Ⓜ) 3 : 11 : DD (Drum Ⓜ) 3 : 12 : DD (Capstan Ⓜ)	Rotating in right direction, inverting, stopping of each motor can be separately controlled. • Loading Motor • Drum Motor (※ See to 4) • Capstan Motor

MODE		PAGE/DATA/ADDRESS	Contents
TEST MODE	Sensor check	3 : 21 : DD	The following sensor is input by performing A/D selecting, and the A/D selecting value can be confirmed. TOP sensor, End sensor, S REEL FG, T REEL FG, Thermistor for SWP correction DEW sensor. (※ See to 5)
	Reception contents check of wireless remote control	1 : -- : 1E and 1D	The received code contents of the remote control code can be confirmed. (※ See to 6)

※1 **Emergency Code Check** With the SENSER LANC (The emergency code has the first emergency and last emergency. The last emergency side is changed when emergency is generated ; the first emergency side records the only code generated first.)

			First	Last	
PAGE	D	ADDRESS	20, 21	24, 25	← Emergency code
PAGE	D	ADDRESS	22	26	← Mode when emergency is generated

Displayed → Be sure to rewrite the address from 20 to 26 to data 00 after the operation.

(1) Emergency code list

Code		Emergency contents
20H, 24H	21H, 25H	
00	00	Normal mode
01	00	Loading Motor emergency.
02	00	Unloading, Reel emergency.
04	00	Steady, Reel emergency.
08	00	Capstan emergency.
00	01	Drum steady, FG emergency.
00	02	Drum steady, PG emergency.
00	21	Drum steady, FG emergency.
00	22	Drum steady, PG emergency.
00	41	Loading, Drum FG emergency.
00	42	Loading, Drum PG emergency.
00	81	Unloading, Drum FG emergency.
00	82	Unloading, Drum PG emergency.
——	——	Dram steady Phase emergency.

- In order to delete the contents of [the first and the last emergency], write with SENSER LANC as follows.

Page 1	Address 00	Data 01

After that, write data 00 into each address. After writing, return to

Page 1	Address 00	Data 00

(2) Mode code

Mode	Code	Mode	Code
STOP	20	EDIT S CUE	5A
FF	30	EDIT S REV	5B
REW	38	EDIT S STIL	5F
PB	60	+×1	62
CUE	64	−×1	63
REV	65	−STILL	79
STILL	70	+FRAME	76
REC	40	−FRAME	77
REC. P	41	+×2	66
SHUTTLE EDIT (+)	5A	−×2	62
SHUTTLE EDIT (−)	5B	LOADING	21
CAM STBY	41	UNLOADING	13
CAM REC	40	EJECTED	10
REC REV+	58	+SLOW	72
REC REV−	59	−SLOW	73

Note : Pay attention that the above codes are displayed in the reverse order when FU-72P board IC501 μPD75312GF-018 and 024 are mounted.
Example) PB 06

※ 2 RECOG SW Check

With the SENSER LANC

Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	3D	MP-HG		ME/MP	REC PROOF	V MUTE	A MUTE	JOG	VA PB MODE

Bit 4: "1"=REC inhibit
Bit 5: "1"=ME/ 0 : MP
Bit 7: "1"=MPHG/ 0 : Normal

Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	3E	DEW			RP PB MODE	CASSETTE COMPARTMENT LOCK	MODE SW2	MODE SW1	MODE SW0

Bit 2, Bit 1, Bit 0: See to the following list
Bit 3: When locking the cassette Compartment, "1"

• MODE SW CODE LIST

	Address 3E contents			Real port condition			Remark
Position	M SW2	M SW1	M SW0	M SW2	M SW1	M SW0	
EJECT	0	0	0	L	H	H	Cassette Compartment eject position
IA	0	0	1	H	H	H	Interval A
UNLOAD	0	1	0	L	L	H	Normal EJECT unloaded
IB	0	1	1	H	L	H	Interval B
STOP	1	0	0	H	L	L	STOP mode position
IC	1	0	1	H	H	L	Interval C
FWD	1	1	0	L	H	L	Pinch pressure welded
ID	1	1	1	L	L	L	Interval D
SHAKING HEAD POSITION	0	0	0	L	H	L	Shaking head ptsition

☆ This mode releasing is turn off the SENSER LANC.

※ **3 Switch check** (See to the previous page for reading code.)

With the SENSER LANC:

Page 1	Address E8 to ED	Data Refer to table

Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	K IN 7	K IN 6	K IN 5	K IN 4	K IN 3	K IN 2	K IN 1	K IN 0
E 8 K OUT 0	——	REMOTE ON/OFF	T2	T1	——	MACRO AF	SHUTTER	AUTO LOCK
E 9 K OUT 1	——	STEREO	MEMORY	COLOR	DATA SCREEN	ONE PUSH AF	AF ON/OFF	PROGRAM AE
EA K OUT 2	——	SUB	EDIT (+)	EDIT (−)	FRAME	AWB	BACK LIGHT	——
EB K OUT 3	——	STANDBY	PAUSE	RESET	REC	FADER	——	——
EC K OUT 4	——	START/ STOP	PB	ZERO MEMORY	TIME	DATE	AGE	VTR
ED K OUT 5	——	Edit/ OFF	REW	STOP	EJECT	FF	SLOW	CAM

☆ This mode releasing is turn off the SENSER LANC.

- Check the initial set value in shipping after the service, because EE PROM is monuted to VTR in this unit.

D Page Initial set value in shipping (for this unit)

Address	Contents					Set value
0 0 0	Aging mode					00
0 0 1	Each flag area (destination/model /HEAD width1 × 2MUTE)					B8
0 0 2	VTR REC key acceptance authorization					AEP, UK: 00 AUS, E: 01
0 0 3						--
0 0 4	Switching position (low)					Adjustment value
0 0 5	Switching position (high)					Adjustment value
0 0 6	Battery A/D modification value					Adjustment value
0 0 7	Battery end set area					Adjustment value
0 1 0	SR data storage area	EDIT OFF	MP	HI8	LP	--
0 1 1	SR data storage area	EDIT OFF	MP	HI8	SP	--
0 1 2	SR data storage area	EDIT OFF	MP	NOR	LP	26
0 1 3	SR data storage area	EDIT OFF	MP	NOR	SP	24
0 1 4	SR data storage area	EDIT OFF	ME	HI8	LP	--
0 1 5	SR data storage area	EDIT OFF	ME	HI8	SP	--
0 1 6	SR data storage area	EDIT OFF	ME	NOR	LP	26
0 1 7	SR data storage area	EDIT OFF	ME	NOR	SP	24
0 1 8	Titler vertical position adjustment area JOG mode					04
0 1 9	Titler vertical position adjustment area NOR mode					06
0 1 A	Titler horizontal position adjustment area playback mode					31
0 1 B	Titler horizontal position adjustment area EE mode					31
0 1 C	When SR data storage area EDIT is ON : Hi8 mode					--
0 1 D	When SR data storage area EDIT is ON : Normal mode					24
0 1 E						--
0 1 F						--
0 2 0	First generated emergency code (low) (First emergecy)					00
0 2 1	First generated emergency code (high) (First emergency)					00
0 2 2	Mode code when emergency is generated first					00
0 2 3						00
0 2 4	Last generated emergency code (low) (Last emergency)					00
0 2 5	Last generated emergency code (high) (Last emergency)					00
0 2 6	Mode code when emergency is generated last.					00

※ 4 In order to operate the motor singly

[Operation]

Write the following number with the SENSER LANC into | Page 3 | Address DD. |

Then the check of each motor is performed.

10H → Loading motor
11H → Drum motor
12H → Capstan motor

After the set of the above data, operation is performed by pressing the following keys. (When the operation is performed with RM-95, set the HOLD switch to left and release the SENSER LANC.)

FF key → Rotating in right direction
REW key → Inverting
STOP key → Stop

Note) In this mode, operation is only performed on the normally loaded condition.

Note) The motor rotating speed is the normal rotating number. (Drum 30Hz, Capstan SP mode speed, Loading normal speed).

In order to release this mode, turn off the SENSER LANC and turn off the power.

※ 5 In order to read the A/D selecting value (Sensor check)

[Operation]

With the SENSER LANC :

Write | PAGE 3 | Address DD | Data 21 |

The following address (PAGE 3) of the A/D selecting value of each A/D port is displayed.

Address	Selecting value Contents
65	TOP sensor (light ON)
67	TOP sensor (light OFF)
64	END sensor (light ON)
66	END sensor (light OFF)
62	S-REEL FG
63	T-REEL FG
60	Thermistor (for SWP correction)
5F	DEW sensor

The voltage of A/D selecting 1 step : $4.9 \div 256 \fallingdotseq 19mV$

※ 6 In order to check the reception contents of the wireless remote control

With SENSER LANC, the received remote control code is displayed to | PAGE 1 | Address 1E. |

The remote control code is only displayed while the code which the LANC code is shifted to right for 1 bit is pressed, and FF is displayed when the code is released.

The received category code of the remote control is displayed to the upper 4 bit of | PAGE 1 | Address 1D. |

(The description of the remote control code is omitted in this chart.)

4-2. POWER VOLTAGE CHECK (SS-100P BOARD)

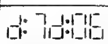
Measuring instrument	Digital voltmeter
SS 4.9V check	
Measurement point	CN506 pin ①
Specified value	4.90±0.15V_{DC}
AUDIO 4.9V check	
Measurement point	CN506 pin ⑦
Specified value	4.90±0.15V_{DC}
EVF 4.9V check	
Measurement point	CN503 pin ①
Specified value	4.90±0.15V_{DC}
LM 5V check	
Measurement point	CN502 pin ⑮
Specified value	4.85±0.15V_{DC}

[Check Method]

1) Each power voltage should satisfy the specified values at normal temperature and humidity.

4-3. SYSTEM CONTROL SYSTEM ADJUSTMENT

4-3-1. Battery Down Adjustment

Mode	CAMERA REC
Signal	Unnecessary
Measurement point	Display on the adjustment remote control
Measuring instrument	Adjustment remote control
Adjustment page	D
Adjustment address	06
Specified value	 (reference value) Note : Actually, exact data of 5.5V_{DC} of page D address 06 is written.

[Connection]

1) Make the set MIC board, EVF board, and CAMERA section connected.
2) Connect the adjustment remote control to the REMOTE terminal.
3) Connect the digital voltmeter so to measure the voltage of the stabilized power supply unit connected to the battery terminal.

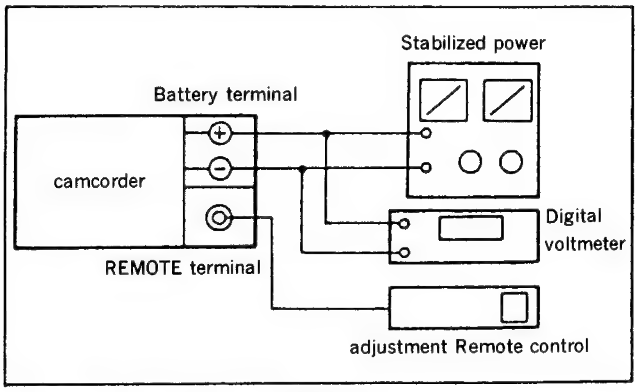


Fig. 4-3.

[Adjustment Method]

1) Turn on the POWER switch. (CAMERA mode)
2) Adjust the output of the stabilized power supply unit to be 5.58±0.01 V_{DC} (battery terminal voltage).
3) Turn on the CAMERA REC mode.
4) Set the HOLD switch of the remote control for adjustment to the HOLD side.
5) Press once the EDIT SEARCH (+) button of the adjustment commander select page 1, select data 01 of address 00, and release the protector.
6) Press four times the EDIT SEARCH (−)button of the remote control for adjusment. (Set the adjustment page to D.)
7) Be sure to set the adjustment address 06 with FF or REW button of the remote control for adjustment, and press the PAUSE button.



8) Turn off the POWER switch.

[Checking Method]

1) Turn on the power.
2) Adjust the output of the stabilized power source to be 5.66±0.01V_{DC}.
3) Set the camera REC mode.
4) After five seconds,TALLY should flash at 0.8Hz. (Battery Pre End)
5) Adjust the output of the stabilized power source to be 5.58±0.01V_{DC}.
6) Set the camera REC mode.
7) After five seconds, STOP mode should be set and TALLY should flash a 3.2Hz. (Battery END)

4-3-2. Clock Accuracy Adjustment (FU-72P Board)

Mode	E-E
Signal	Unnecessary
Measurement point	IC501 pin ⑲
Measuring instrument	Ocsilloscope Freguency counter
Adjustment element	CT501
Specified value	512.000±0.001Hz

[Adjustment Method]

1) Adjust to 512.000±0.001Hz with CT501.

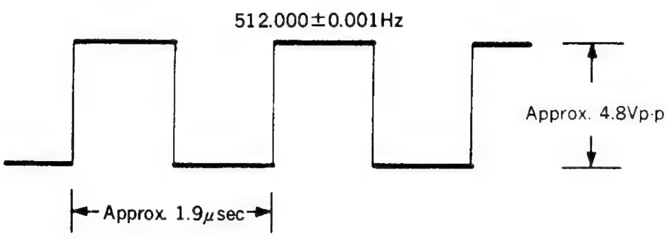


Fig. 4-4.

4-4. SERVO SYSTEM ADJUSTMENT

4-4-1. Switching Position Adjustment (SS-100P Board)

Mode	Playback
Signal	Alignment tape : Operation check (WR5-1CP)
Measurement point	CH1 : CN508 pin ④ (SWP) CH2 : CN508 pin ③ (PB RF)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	05 04
Specified value	$t_1=0\pm5\mu$sec $t_2=0\pm5\mu$sec

[Adjustment Method]

1) Set the HOLD switch of the remote control for adjustment to the HOLD side. (ADJUST MODE is set.)
2) Select page 1 with the remote control for adjustment and select adjustment data 01 of adjustment address 00. (Protector is released.)



3) Press four times the EDIT SEARCH (—) button of the remote control for adjustment. (Adjustment page D is set.)
4) Select the adjustment address to 05 in order to change the adjustment data, and adjust to $t_1=0\pm5\mu$sec.

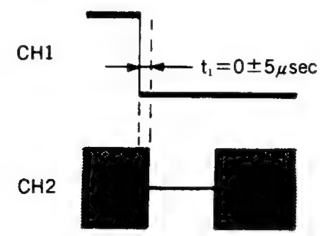


Fig. 4-5.

5) Press the PAUSE button in order to store the adjustment data.
6) Select the adjustment address 04 in order to change the adjustment data and adjust to $t_2=0\pm5\mu$sec.

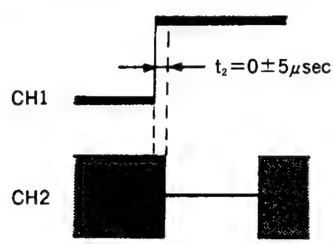


Fig. 4-6.

7) Press the PAUSE button in order to store the adjustment data.

4-4-2. Oscillation Frequency Adjustment (SS-100P Board)

Mode	Record
Signal	Unnecessary
Measurement point	Q903 collector
Measuring instrument	Oscilloscope Frequency counter
Adjustment element	RV901
Specified value	475±5kHz

[Adjustment Method]

1) Adjust to 475±5kHz with RV901.

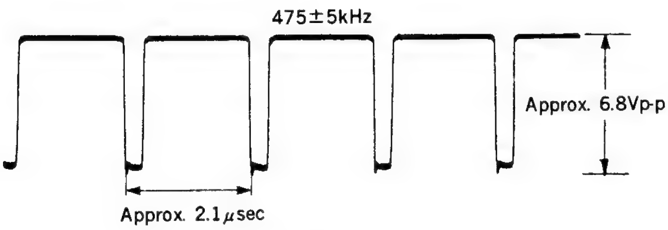


Fig. 4-7.

4-4-3. Output Voltage Adjustment (SS-100P Board)

Mode	Record
Signal	Unnecessary
Measurement point	CN507 pin ⑲
Measuring instrument	Digital voltmeter
Adjustment element	RV902
Specified value	$4.90 \pm 0.05V_{DC}$

[Adjustment Method]

1) Adjust to $4.90 \pm 0.05V_{DC}$ with RV902.

4-5. VIDEO ADJUSTMENT

The adjustment of the video system should in principle follow the adjustment procedure below. The color video input signal supplied from the pattern generator is used as the video input signal for video adjustment in the REC mode. Make sure that the SYNC signal and color burst signal are matched with the standard specified for set-up as shown in the Fig. 4-2 during adjustment.

[Adjustment Sequence]

1) Playback Frequency Characteristic Adjustment
2) X'tal Oscillator fo Check
3) REC E-E Level Adjustment
4) IR Adjustment
5) Chroma Comb Filter Adjustment
6) Emphasis Y Level Adjustment
7) Y FM Carrier Frequency Adjustment
8) Y FM Deviation Adjustment
9) REC Y FM Level Adjustment
10) Chroma Emphasis Adjustment
11) HUE Phase Deviation Adjustment
12) REC Chroma Level Adjustment
13) PB CCD Level Adjustment
14) PB Level Adjustment
15) 4FSC Frequency Adjustment
16) Controller Frequency Adjustment
17) Tracking TH Adjustment
18) Character Generator SG Frequency Adjustment
19) DDS Character Position Adjustment

4-5-1. Playback Frequency Characteristic Adjustment (SS-100P Board)

(1) CH1, CH2 Adjustments

Mode	Playback
Signal	Alignment tape : Frequency characteristic adjustment (WR5-6C)
Measurement point	CH1 : CN508 pin ④ (D SWP) CH2 : CN508 pin ③ (PB RF)
Measuring instrument	Oscilloscope
Adjustment element	PB 1-CH : RP-77 board RV102 PB 2-CH : RP-77 board RV101
Specified value	3.58MHz level : 5.5MHz level=4 : 3±0.3

[Adjustment Method]

1) Adjust PB RF OUT of PB 1-CH and PB 2-CH with respective RV so as to get the specified value.

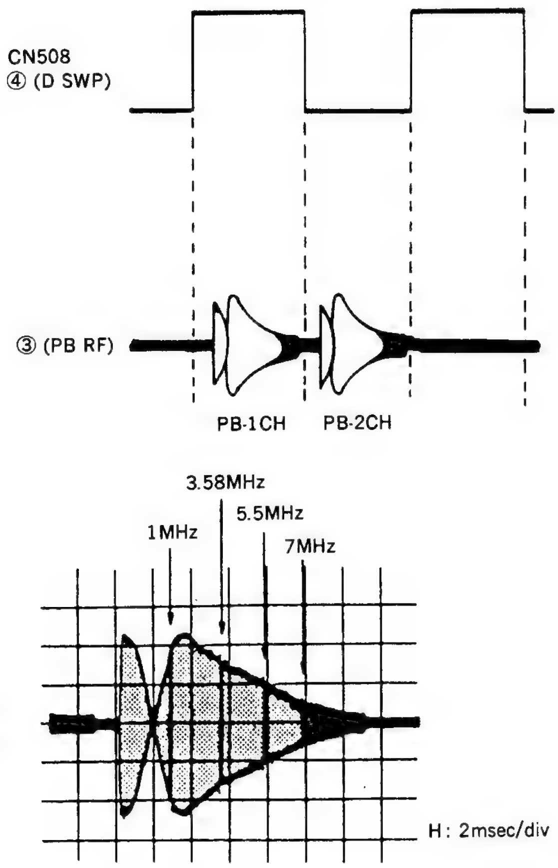


Fig. 4-8.

(2) CH1′ Adjustment

Mode	Playback (service mode)
Signal	Alignment tape for frequency characteristic adjustment (WR5-6C)
Measurement point	CH1 : CN508 pin ④ (D SWP) CH2 : CN508 pin ③ (PB RF)
Measuring instrument	Oscilloscope
Adjustment page	1
Adjustment address	4D
Adjustment element	RP-77 board RV150
Specified value	3.58MHz level : 5.5MHz level=4 : 3±0.3

[Adjustment Method]

1) Turn on the HOLD of the adjustment remote control.
2) Set the adjustment remote control page 1 and the adress 4D, and write down the data value. (This data is set to A.)
3) Adjust the data to 20 with the adjustment remote control.
4) Feed the address in order to store the adjustment data.
5) Turn off the HOLD of the adjustment remote control and set the playback mode.
6) Adjust RV150 so that the ratio of 5.5MHz level to that 3.58MHz becomes 4 : 3±0.3.
7) After the adjustment, set the page 1 and the address 4D, and set the data A.
8) Feed the address in order to store the adjustment data.

4-5-2. X'tal Oscillator fo Check (VA-46P Board)

Made	E-E
Signal	Color bar
Measurement point	IC203 pin ⑫
Measuring instrument	Oscilloscope Frequency counter
Specified value	4433619±70Hz

[Check Method]

1) Make sure that the oscillation frequency of IC203 pin ⑫ is 4433619±70Hz.

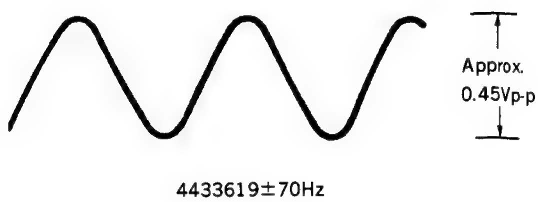


Fig. 4-9.

4-5-3. REC E-E Level Adjustment (VA-46P Board)

Mode	Record or E-E
Signal	Color bar
Measurement point	J201 (VIDEO OUT terminal)
Measuring instrument	Oscilloscope
Adjustment element	RV205
Specified value	1.000±0.025Vp-p

[Adjustment Method]

1) Adjust to 1.000±0.025Vp-p with RV205.

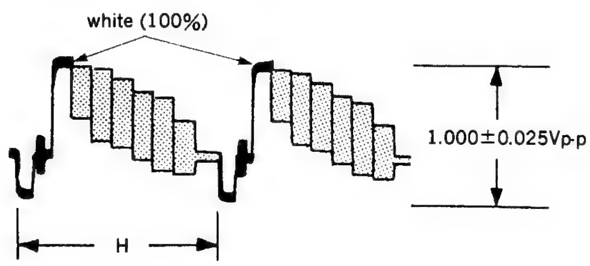


Fig. 4-10.

4-5-4. IR Adjustment (VA-46P Board)

Mode	Record
Signal	Color bar
Measurement point	IC201 pin ⑦
Measuring instrument	Oscilloscope
Adjustment element	RV201
Specified value	Minimum red residual chroma component (50mVp-p or less)

[Connection]

1) Short TP003 and TP007.

[Adjustment Method]

1) Minimize the red residual chroma component with RV201. (50mVp-p or less)
2) After the adjustment, open TP003 and TP007.

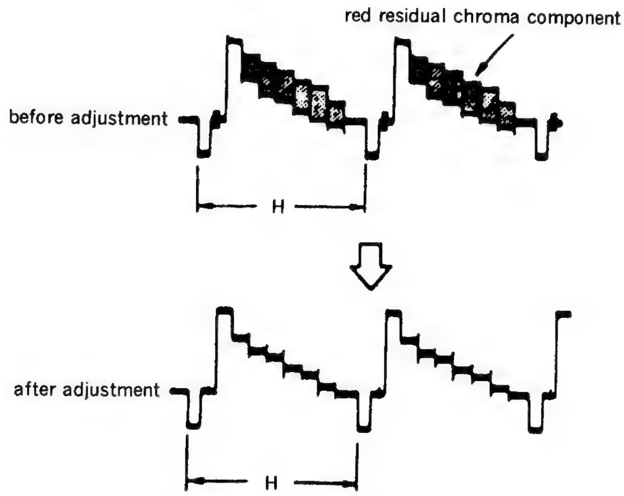


Fig. 4-11.

4-5-5. Chroma Comb Filter Adjustment (VA-46P Board)

Mode	Record
Signal	Color bar
Measurement point	IC201 pin ⑪
Measuring instrument	Oscilloscope
Adjustment element	RV204 RV211
Specified value	Minimum red residual chroma component (40mVp-p or less)

[Adjustment Method]

1) Adjust RV204 and RV211 alternately and minimize the red residual chroma component. (40mVp-p or less)

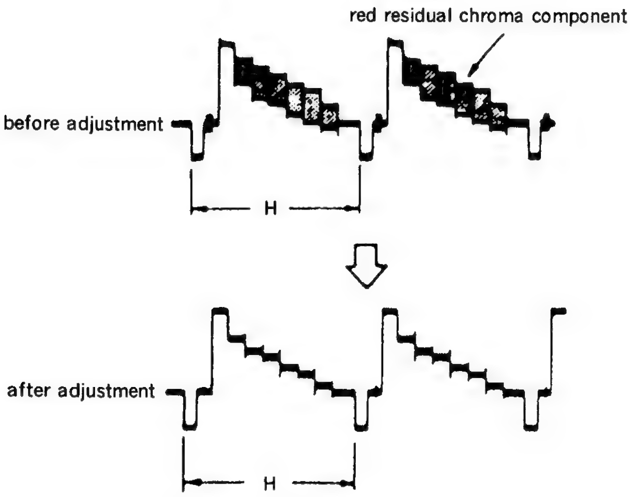


Fig. 4-12.

4-5-6. Emphasis Y Level Adjustment (VA-46P Board)

Mode	Record
Signal	Color bar
Measurement point	IC201 pin ③
Measuring instrument	Oscilloscope
Adjustment element	RV202
Specified value	500±25mVp-p

[Adjustment Method]

1) Adjust to 500±25mVp-p with RV202.

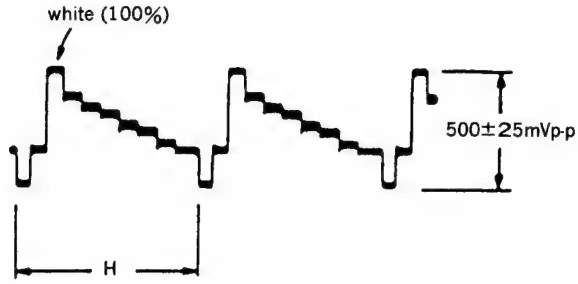


Fig. 4-13.

4-5-7. Y FM Carrier Frequency Adjustment (VA-46P Board)

Mode	Record
Signal	Non-signal
Measurement point	IC101 pin ⑭ side terminal of RV101 (REC Y)
Measuring instrument	Frequency counter
Adjustment element	RV207
Specified value	4.38±0.04MHz

[Adjustment Method]

1) Adjust to 4.38±0.04MHz with RV207.
2) Make this adjustment after completing 4-5-8. Y FM Deviation Adjustment.



Fig. 4-14.

4-5-8. Y FM Deviation Adjustment (VA-46P Board)

Mode	Record and Playback
Signal	Color bar
Measurement point	J201 (VIDEO OUT terminal)
Measuring instrument	Oscilloscope
Adjustment element	RV206
Specified value	Playback level of 1.00±0.05Vp-p

Note 1: 4-5-7. Y FM Carrier Frequerncy adjustment must been completed.

Note 2: VIDEO OUT terminal (J201) must be terminated at 75Ω.

[Adjustment Method]

1) Record the color bar signal.
2) Playback the recorded signal.
3) Check the playback output level.
   Specified value: 1.00±0.05Vp-p
4) When the specified value is not, turn RV206 as follows and repeat the steps 1) through 3) above.

	RV206 Rotating Direction
When larger than specified value	Clockwise direction (↻)
When smaller than specified value	Counterclockwise direction (↺)

Table. 4-1.

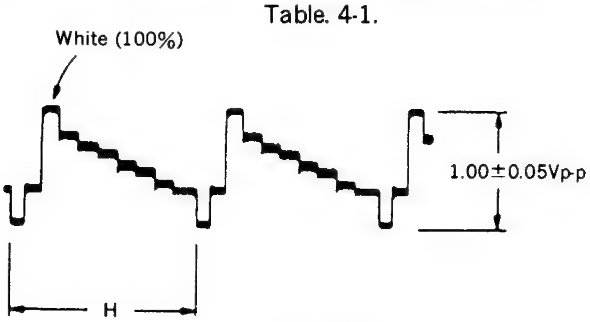


Fig. 4-15.

4-5-9. REC Y FM Level Adjustment (VA-46P Board)

Mode	Record
Signal	Non-signal
Measurement point	CN507 pin ⑤
Measuring instrument	Oscilloscope (20MHz bandwidth ON)
Adjustment element	RV101
Specified value	205±10mVp-p

[Adjustment Method]

1) Adjust to 205±10mVp-p with RV101.

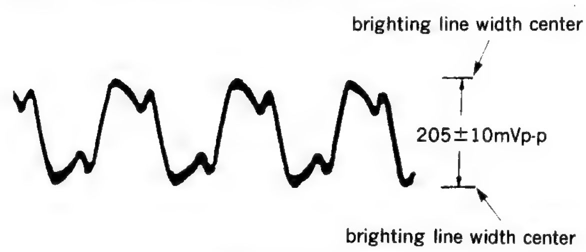


Fig. 4-16.

4-5-10. Chroma Emphasis Adjustment (VA-46P Board)

Mode	Record
Signal	Color bar
Measurement point	IC203 pin ㉔
Measuring instrument	Oscilloscope
Adjustment element	FL302
Specified value	Minimum red level

[Connection]

1) Short between IC203 pin ㉔ and GND at 3.3kΩ resistance.

[Adjustment Method]

1) Minimize the red level with FL302.
2) After the Adjustment, open between IC203 pin ㉔ and GND.

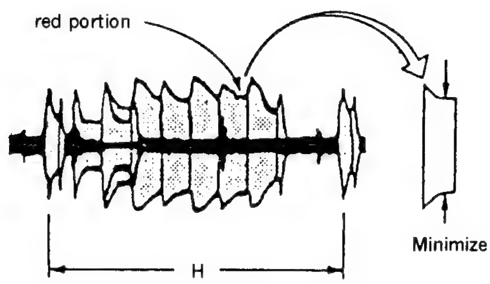


Fig. 4-17.

4-5-11. HUE Phase Deviation Adjustment (VA-46P Board) (Use a Vectorscope)

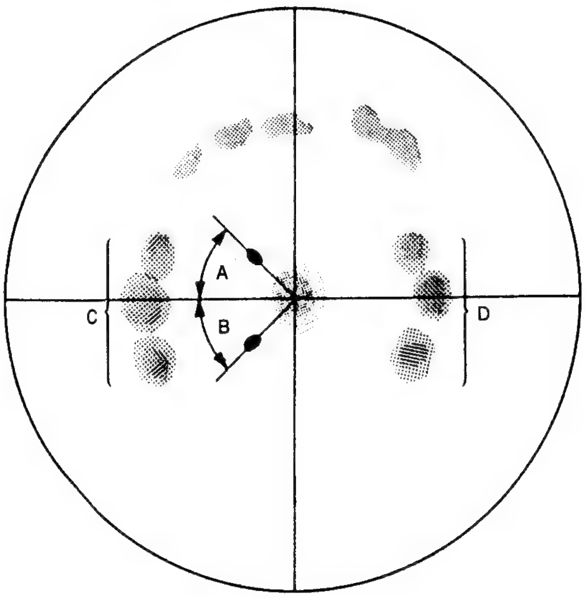
Mode	Playback+Pause
Signal	Alignment tape for operation check (WR5-5CSP), Color bar portion
Measurement point	J201 (VIDEO OUT)
Measurement equipment	Vectorscope
Adjustment element	RV353 (FSC) RV351 (APC LPE)
Specified value	See Fig. 4-18.

[Connection]

1) Input 4.43MHz signal from Pin⑫ of IC203 to 1CH of an oscilloscope.
2) Connect 1CH output of an oscilloscope to the EXT. subcarrier reference input of a vectorscope.
3) Put on the EXT. subcarrier switch of a vectorscope.

[Adjustment Method]

1) Adjust with RV353 so as to equalize A and B as shown in Fig. 4-18.
2) Adjust with RV351 so as to minimize the shaking of each three brighting point of C and D.



RV353: A=B
RV351: make C and D a contrast

Fig. 4-18.

4-5-12. REC Chroma Level Adjustment (VA-46P Board)

Mode	Record
Signal	Color bar
Measurement point	CN507 pin ①
Measuring instrument	Oscilloscope
Adjustment element	RV301
Specified value	Red portion level=130±10mVp-p

[Adjustment Method]

1) Adjust the red portion to 130±10mVp-p with RV301.

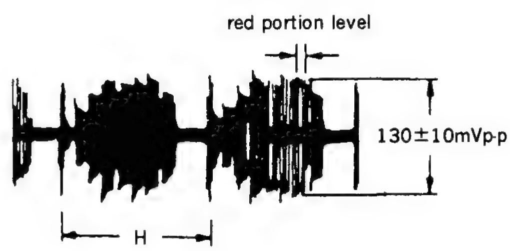


Fig. 4-19.

4-5-13. PB CCD Input Level Adjustment (VA-46P Board)

Mode	Playback
Signal	Alignment tape : Operation check (WR5-5CSP) color bar portion
Measurement point	IC201 pin ㉑
Measuring instrument	Oscilloscope
Adjustment element	RV210
Specified value	500±25mVp-p

[Adjustment Method]

1) Adjust to 500±25mVp-p with RV210.

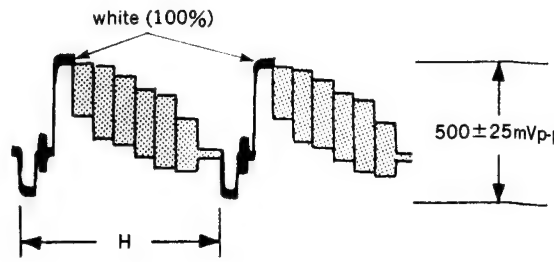


Fig. 4-20.

4-5-14. PB Level Adjustment (VA-46P Board)

Mode	Playback
Signal	Alignment tape : Operation check (WR5-5CSP) color bar portion
Measurement point	J201 (VIDEO OUT terminal)
Measuring instrument	Oscilloscope
Adjustment element	RV203
Specified value	1.00±0.05Vp-p

[Adjustment Method]

1) Adjust to 1.00±0.05Vp-p with RV203.

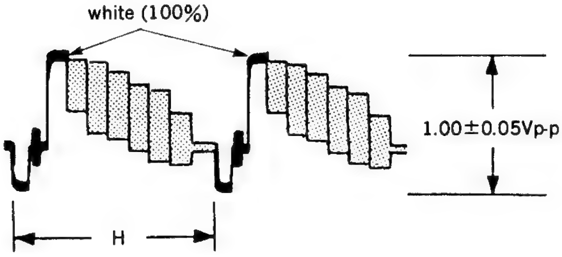


Fig. 4-21.

4-5-15. 4FSC Frequency Adjustment (CT-21P Board)

Mode	E-E
Signal	Non-signal
Measurement point	Q707 Emitter
Measuring instrument	Oscilloscope Frequency counter
Adjustment element	CT702
Specified value	4433619±50Hz
Adjustment procedure	IC704 pin ⑲ : $5V_{DC}$ IC704 pin ㉝ : $3.5V_{DC}$

[Adjustment Method]

1) Adjust to 4433619±50Hz with CT702.

4-5-16. Controller Frequency Adjustment (CT-21P Board)

Mode	E-E (All title white display)
Signal	Not required
Measurement point	VA-46P board J201 (VIDEO OUT)
Measuring instrument	Oscilloscope
Adjustment element	CT701
Specified value	2.0±0.3μ sec

Note : Perform the adjustment with the camera installed.

[Adjustment Method]

1) Display the all title (white) by fetching with the camera E-E.
2) Measure the VIDEO OUT terminal with the oscilloscope, adjust so that the width between the right end of the title and the H-SYNC is 2.0±0.3μ sec.

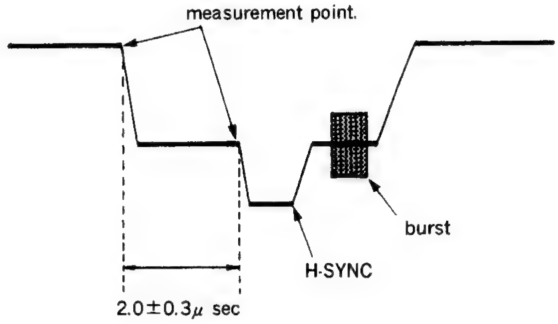


Fig. 4-22.

4-5-17. Tracking TH Adjustment (CT-21P Board)

Mode	E-E
Signal	Staircase (8 stairs)
Measurement point	CH 1 : W704 pin ⑦ (Staircase input) CH 2 : IC703 pin ① (A/D select output)
Measuring instrument	Oscilloscope
Adjustment element	RV703
Specified value	Staircases to the second stair should be fetched and the third one should not be fetched.

[Adjustment Method]

1) Adjust to satisfy the specified value with RV703. (Refer to Fig. 4-23.

Note : In the case that ten staircases are used. the third stair should be fetched and the fourth one should not be fetched.

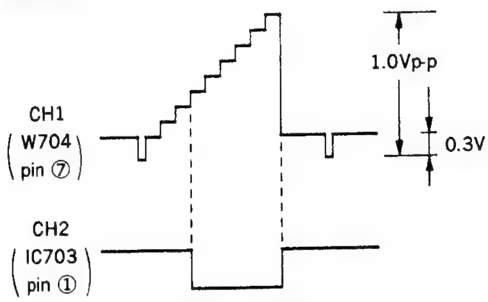


Fig. 4-23.

4-5-18. Character Generator SG Frequency Adjustment (CT-21P Board)

Mode	E-E
Signal	Non-signal
Measurement point	IC902 pin ⑲
Measuring instrument	Oscilloscope Frequency counter
Adjustment element	CT901
Specified value	1562500±100Hz

[Adjustment Method]

1) Adjust to 1562500±100Hz with CT901.

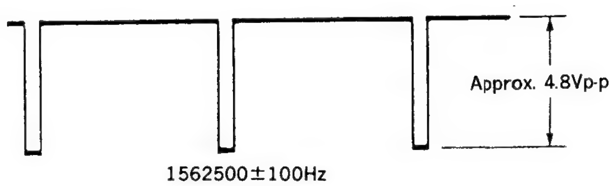


Fig. 4-24.

4-5-19. DDS Character Position Adjustment (CT-21P Board)

Mode	E-E
Signal	Color bar
Measurement point	EVF
Measuring instrument	EVF
Adjustmen element	CT902
Specified value	Refer to Fig. 4-25.

[Adjustment Method]

1) Turn on the DATA SCREEN switch (VK-4P board S508). (Check that it is displayed on the EVF.)
2) Adjust the last inner line to the dividing line between red and blue with CT902. (Refer to Fig. 4-25)
3) Turn off the DATA SCREEN switch (VK-4P board S508). (Check that it went out on the EVF.)

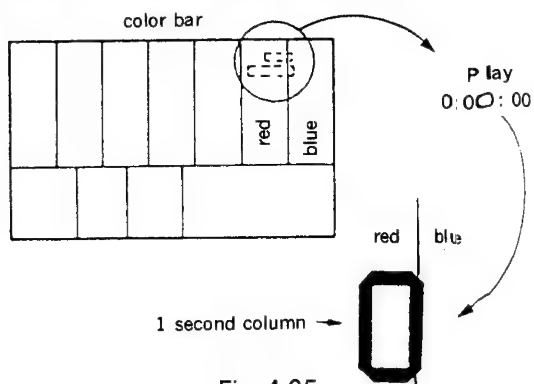


Fig. 4-25.

4-6. AUDIO SYSTEM ADJUSTMENT

- Perform adjustment with the color bar signal used as the video input signal.

[Connection of audio measuring instrument]

In addition to the video system measuring instruments, connect the audio system measuring instruments as shown in the figure below, and set the power switch to the video position for adjustment.

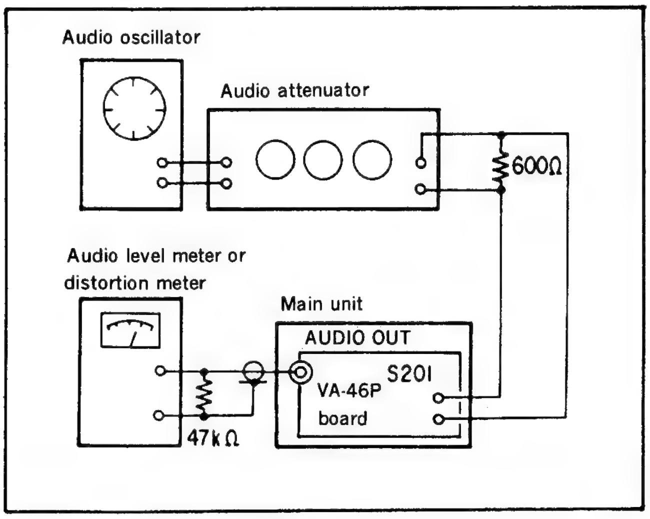


Fig. 4-26.

4-6-1. AFM Carrier Frequency Check (VA-46P Board)

Mode	Recording (Stereo mode)
Signal	Non-signal
Measurement point	IC400 pin ㊸ (REC AFM)
Measuring instrument	Frequency counter
Specified value	1.50±0.01MHz

Note : Connect the frequency counter through a buffer amplifier (oscilloscope, etc.) having high impedance and low capacitance.

[Checking Method]

1) Turn OFF the audio oscillator output.
2) Confirm that the AFM carrier frequency is 1.50±0.01MHz.

4-6-2. REC AFM Carrier Level Adjustment (VA-46P Board)

Mode	Recording (Monoral)
Signal	Non-signal
Measurement point	IC400 pin ㊸ (REC AFM)
Measuring instrument	Oscilloscope
Specified value	160±5mVp-p

[Checking Method]

1) Confirm that the level is 160±5mVp-p.

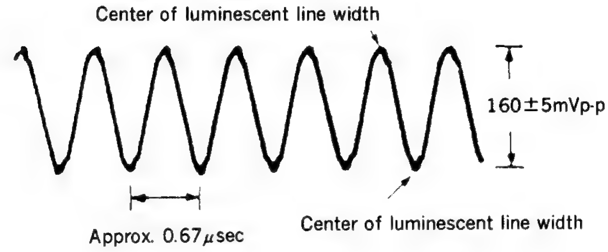


Fig. 4-27.

4-6-3. Playback Level Check

Mode	Playback
Signal	Alignment tape : Operation checking (WR5-5CSP)
Measurement point	Audio output terminal
Measuring instrument	Audio level meter
Specified value	−7.5±2dBs

[Checking Method]

1) Confirm that the audio output level is −7.5±2dBs.

4-6-4. E-E Output Level Check

Mode	E-E
Signal	400Hz, −7.5dBs
Measurement point	Audio output terminal
Measuring instrument	Audio level meter
Specified value	−7.5±3dBs

[Checking Method]

1) Make sure that the audio output level is −7.5±3dBs.

4-6-5. Overall Level Characteristics Check

Mode	Self-recording and playback
Signal	400Hz, −7.5dBs.
Measuremrnt point	Audio output terminal
Measuring instrument	Audio level meter
Specified value	−7.5±3dBs.

[Checking Method]

1) Record the signal.
2) Playback the recorded section
3) Make sure that the audio output level is −7.5±3dBs.

4-6-6. Overall Frequency Characteristics Check

Mode	Self-recording and playback
Signal	Ⓐ 400Hz, −17.5dBs Ⓑ 30Hz, −17.5dBs Ⓒ 10Hz, −17.5dBs
Measurement point	Audio output terminal
Measuring instrument	Audio level meter
Specified value	With the 400Hz playback output level as 0dB, the playback output level of 30Hz and 10kHz is 0±3dB

[Checking Method]

1) Record signal Ⓐ through Ⓒ in order.
2) Playback the recorded sections.
3) With the 400Hz playback output level as 0dB, confirm that the playback output level of 30Hz and 10kHz is 0± 3dB.

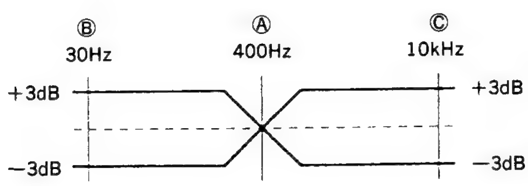


Fig. 4-28.

4-6-7. Overall Distortion Check

Mode	Self recording and playback
Signal	400Hz, −7.5dBs
Measurement point	Audio output terminal
Measuring instrument	Distorsion meter
Specified value	Less than 0.8%*1

[Checking Method]

1) Record the signal.
2) Playback the recorded section.
3) Confirm that the distortion is less than 0.8%.*1
   * 1 Value when 200Hz to 3kHz BPF is used.

4-6-8. Overall Noise Level Check

Mode	Self-recording and playback
Signal	No signal (Shorting plug is inserted into audio input jack)
Measurement point	Audio input terminal
Measuring instrument	Audio level meter
Specified value	Less than −62.0dBs*2

[Checking Method]

1) Record the signal
2) Playback the recorded section
3) Make sure that the noise level is less than −62.0dBs.*2
   * 2 Value when IHF-A hearing correction filter is used.

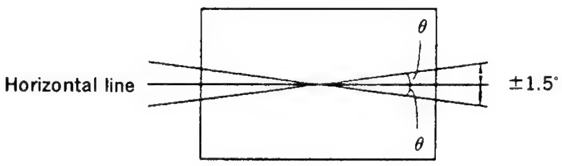
4-7. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT (TYPE A) (VF-27P BOARD)

4-7-1. Horizontal Tilt Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 4-29.

[Adjustment Method]

1) By turning RV904 (BRIGHT), adjust for a luminance level which provides appropriate visibility of the CRT screen.
2) Loosen the DY (deflection yoke) tightening nut.
3) Make the image horizontal by rotating DY.
4) Retighten the DY tightening nut. (Do not tighten excessively.)



Specified value: Image orientation within ±1.5° of horizontal line.

Fig. 4-29.

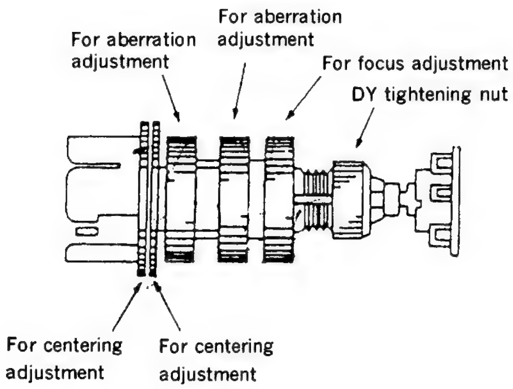


Fig. 4-30.

4-7-2. Centering Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 4-31.

[Adjustment Method]

1) Turn the centering adjustment rings to provide an image with even night, left, upper and lower margins. (See Fig. 4-30.)

Note : Since the centering position is affected by the earth magnetism, turn the equipment over 360° horizontally, and make adjustments at the orientation which exhibits median displacements of the image.

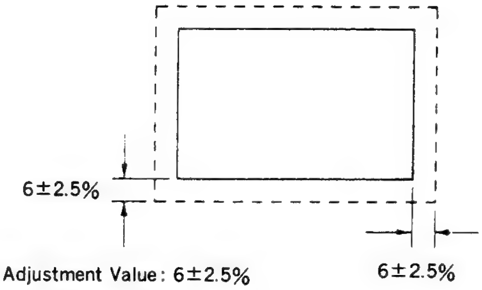


Fig. 4-31.

4-7-3. Focus Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion

[Adjustment Method]

1) Adjust for optimum focus using the focus ring. (See Fig. 4-30.)

4-7-4. Aberration Adjustment

Mode	E-E
Signal	Dot pattern
Specified value	See Fig. 4-32.

[Adjustment Method]

1) Use the aberration adjustment rings to adjust any trailing dots to within 2 times the dot diameter and any fan shaped aberrations to within the dot diameter.
2) If off center, repeat the Centering Adjustment.

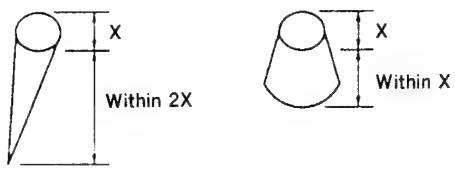


Fig. 4-32.

4-7-5. Horizontal Oscillation Frequency Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP)
Measurement point	CN904 pin ⑤
Measuring instrument	Digital voltmeter or oscilloscope (DC range)
Adjustment element	RV901
Specified value	$2.60 \pm 0.05 V_{DC}$

[Adjustment Method]

1) Adjust to $2.60 \pm 0.05 V_{DC}$ using RV901.

4-7-6. Horizontal Amplitude Adjustment

Mode	Playback
Signal	Alignment tape for cheking operation (WR5-5CSP) Monoscope portion
Adjustment element	C911
Specified value	$6.0 \pm 3.0\%$

[Adjustment Method]

1) Line up the upper and lower sections of the monoscope image with the upper and lower edges of the screen by rotating RV902.
2) Rotate RV904 to set the brightness to the normal level.
3) Short or open the pattern (A) of the H size adjustment capacitor (C911) to provide horizontal overscans of $6.0 \pm 3.0\%$ (total of left and right). (See Fig. 4-34.)

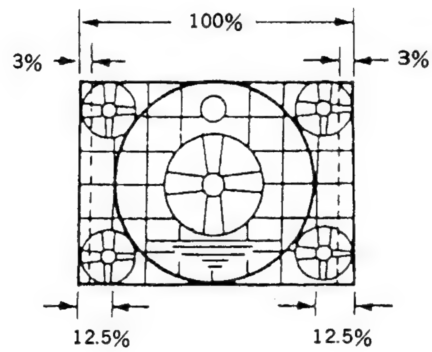
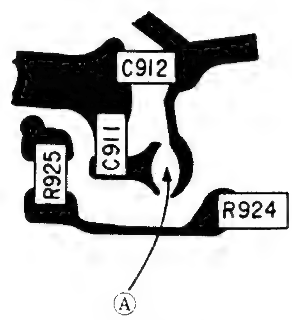


Fig. 4-33.



VF-27P Board
(conductor side)

A section	H size
Open	Large
Short	Small

Fig. 4-34.

4-7-7. Vertical Amplitude Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	RV902
Specified value	6.0±3.0%

[Adjustment Method]

1) By turning RV902, adjust vertical overscan to 6.0±3.0% (upper and lower total).

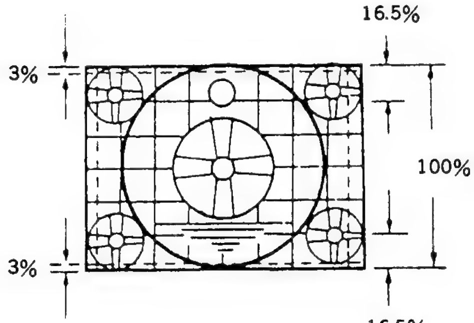


Fig. 4-35.

4-7-8. Brightness, Contrast Adjustments

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	Brightness : RV904 Contrast : RV903

[Adjustment Method]

1) Perform brightness and contrast adjustments alternately until the bright and dark areas of a gray scale are displayed correctly. (The bright areas should not be made too bright to avoid a fuzzy display of the cross-hatches in the monoscope circle, and the brightness of the dark areas should be such that discrimination between the darkest and second darkest area is possible.)

4-7-9. Horizontal Amplitude, Vertical Amplitude and Focus Checks

Values should conform to specifications given in 4-7-6. Horizontal Amplitude Adjustment and 4-7-7. Vertical Amplitude Adjustment. If not. readjust accordingly, and repeat 4-7-8. Brightness, Contrast Adjustments. In this case, focus needs to be checked. If the image is not clear, perform 4-7-3. Focus Adjustment and 4-7-4. Aberration Adjustment.

4-8. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT (TYPE B) (VF-26P BOARD)

4-8-1. Horizontal Tilt Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 4-37.

[Adjustment Method]

1) Adjust the volume array Ⓓ (BRIGHT) for appropriate brightness on CRT screen. (See Fig. 4-38.)
2) Loosen the DY (deflection yoke) tightening nut. (See Fig. 4-36.)
3) Make a picture horizontal by turning the DY.
4) Retighten the nut. (Do not tighten excessively.)

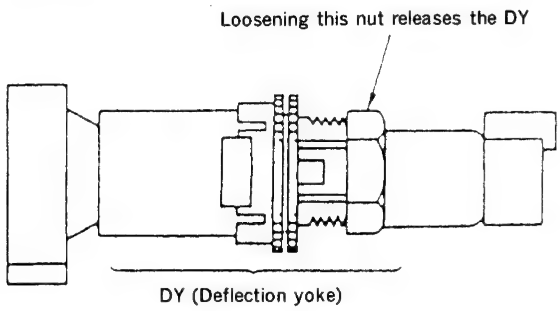


Fig. 4-36.

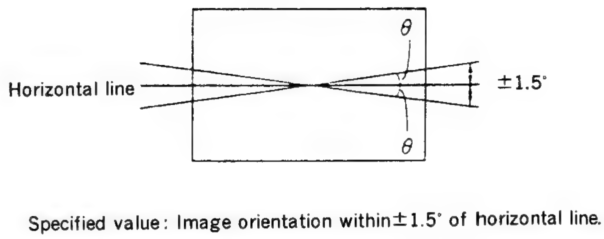


Fig. 4-37.

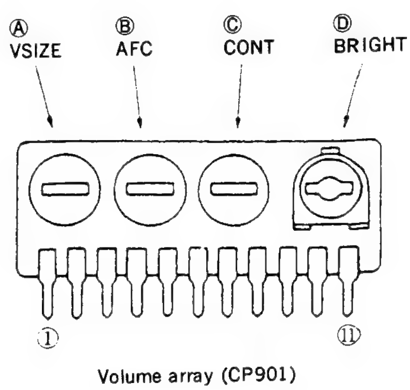


Fig. 4-38.

4-8-2. Centering Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 4-40.

[Adjustment Method]

1) Turn the centering adjustment rings to provide an image with even right, left, upper and lower margins. (See Fig. 4-38.)

Note : Since the cenering position is affected by the earth magnetism, turn the equipment over 360° horizontally, and make adjustments at the orientation which exhibits median displacements of the image.

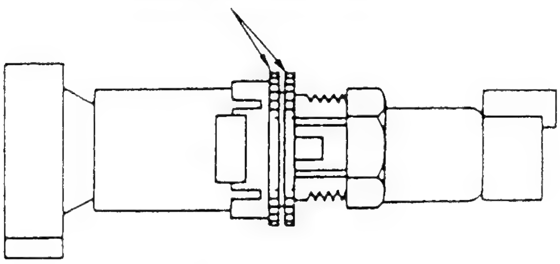


Fig. 4-39.

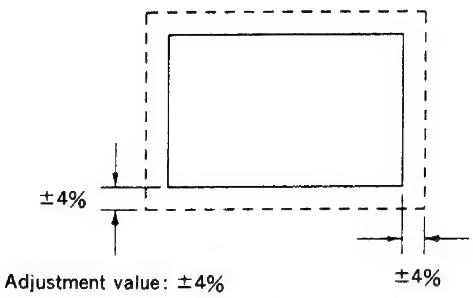


Fig. 4-40.

4-8-3. AFC Adjustment

Mode	E-E or Camera standby
Signal	Color bar
Measurement Point	C915 ⊕ side
Measuring instrument	Digital voltmeter or oscilloscope (DC range)
Adjustment element	Volume array Ⓑ (AFC)
Specified value	$2.6 \pm 0.1V_{DC}$

[Adjustment Method]

1) Adjust volume array Ⓑ (AFC) for $2.6 \pm 0.1V_{DC}$. (See Fig. 4-38.)

4-8-4. Horizontal Amplitude Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	C905
Specified value	6.0±3.0%

[Adjustment Method]

1) Line up the upper and lower section of monoscope image with the upper and lower edges of the screen by rotating volume array Ⓐ (V SIZE). (See Fig. 4-38.)
2) Rotate volume array Ⓓ (BRIGHT) to set the brightness to the normal level.
3) Short or open the pattern [A] of the H size adjustment capacitor (C905) to provide horizontal overscans of 6.0±3.0% (total of left and right).
(See Fig. 4-42.)

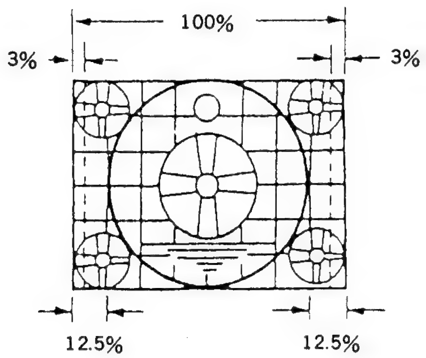
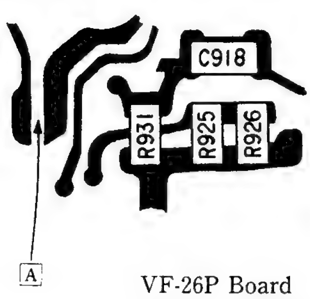


Fig. 4-41.



VF-26P Board
(conductor side)

A section	H size
Open	Large
Short	Small

Fig. 4-42.

4-8-5. Vertical Amplitude Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	Volume array Ⓐ (V SIZE)
Specified value	6.0±3.0%

[Adjustment Method]

1) By turning volume array Ⓐ (V SIZE), adjust vertical overscan to 6.0±3.0% (upper and lower total). (See Fig. 4-43.)

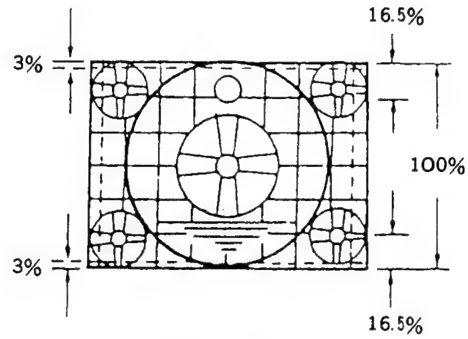


Fig. 4-43.

4-8-6. Focus Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	RV901

[Adjustment Method]

1) Adjust to the best focus point with RV901.

4-8-7. Brightness, Contrast Adjustments

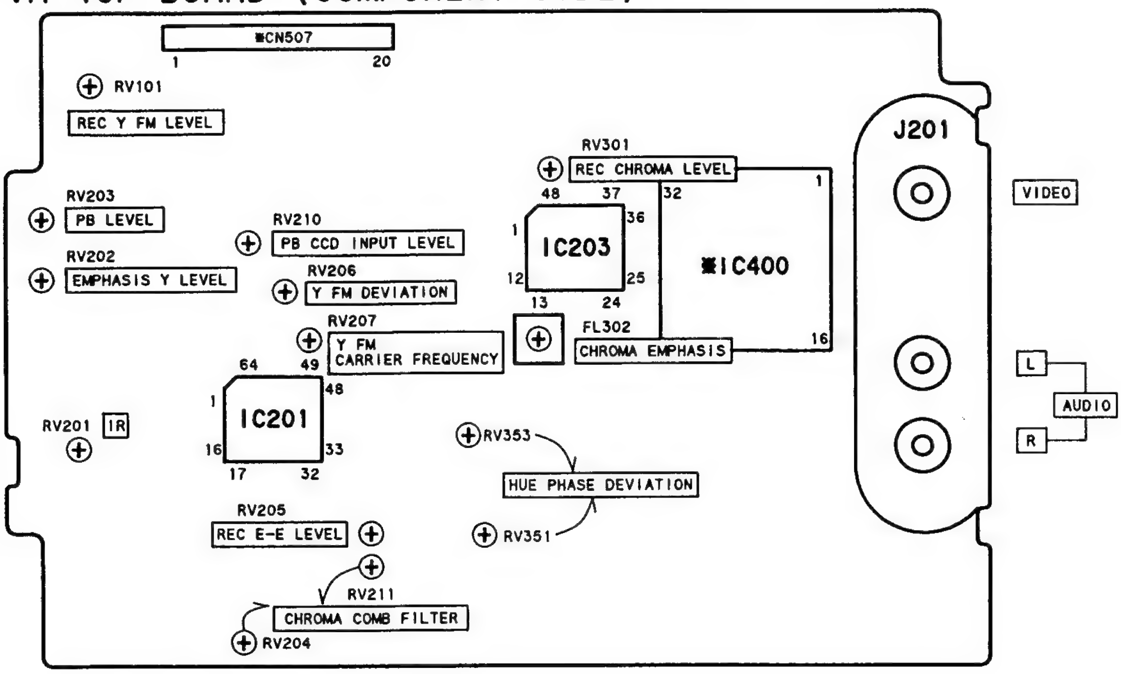
Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	Brightness : Volume array Ⓓ (BRIGHT) Contrast : Volume array Ⓒ (CONT)

[Adjustment Method]

1) Adjust volume array Ⓓ (BRIGHT) and Ⓒ (CONT) alternately until the bright and dark areas of a gray scale are displayed correctly. (The bright areas should not be made too bright to avoid a fuzzy display of the cross-hatches in the monoscope circle, and the brightness of the dark areas should be such that discrimination between the darkest and second darkest areas is possible.) (See Fig. 4-38.)

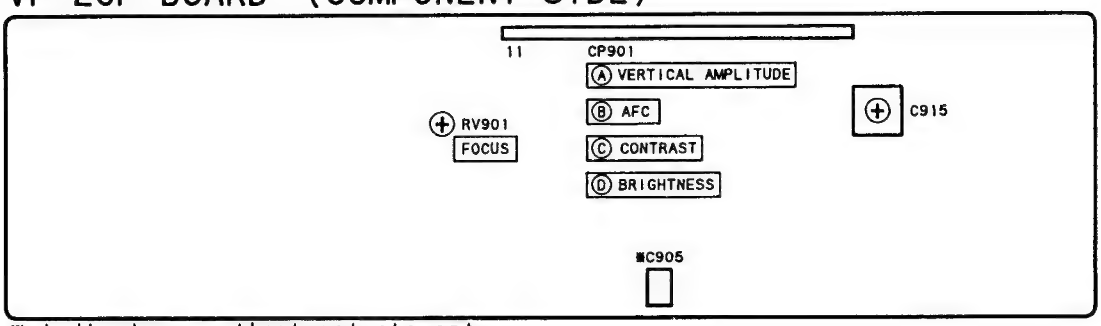
4-9. ADJUSTING PART LOCATION DIAGRAM

VA-46P BOARD (COMPONENT SIDE)



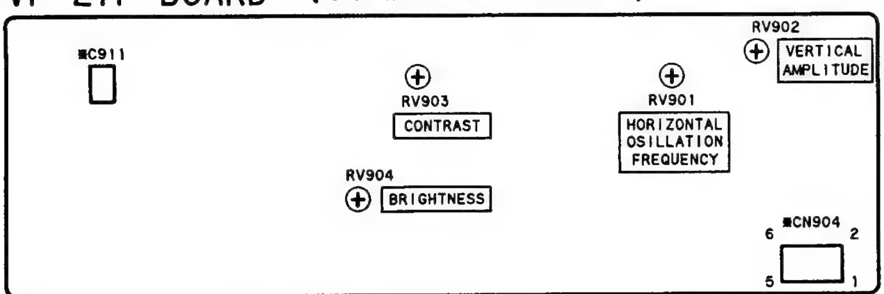
✱: Indicates a adjustment element mounted on the conductor side.

VF-26P BOARD (COMPONENT SIDE)



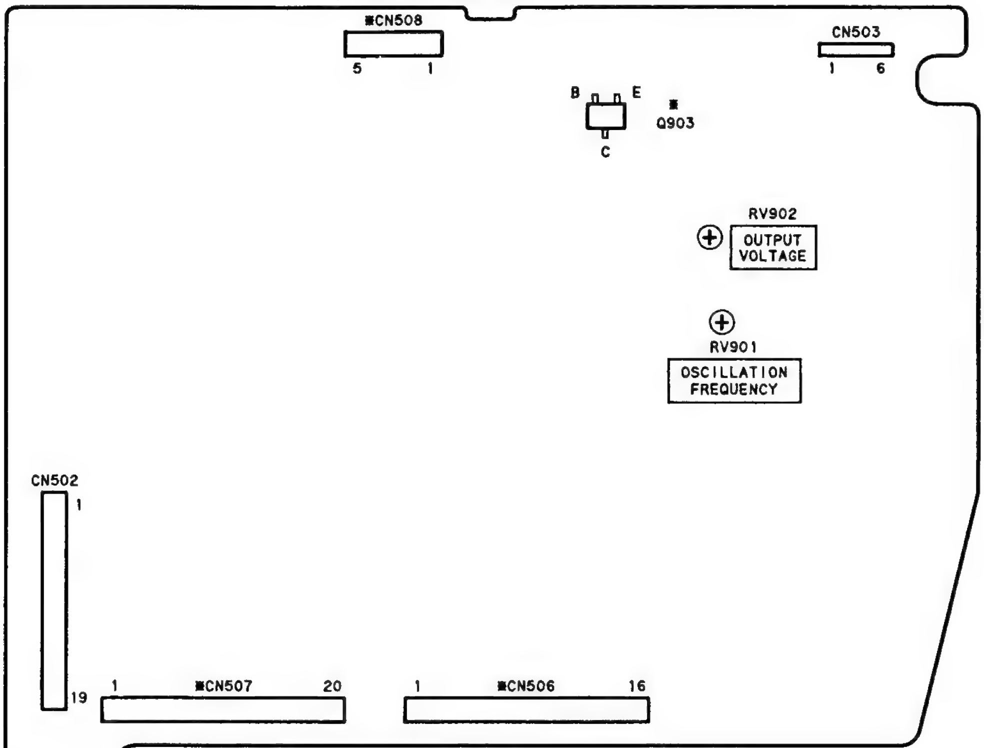
✱: Indicates a adjustment element mounted on the conductor side.

VF-27P BOARD (COMPONENT SIDE)



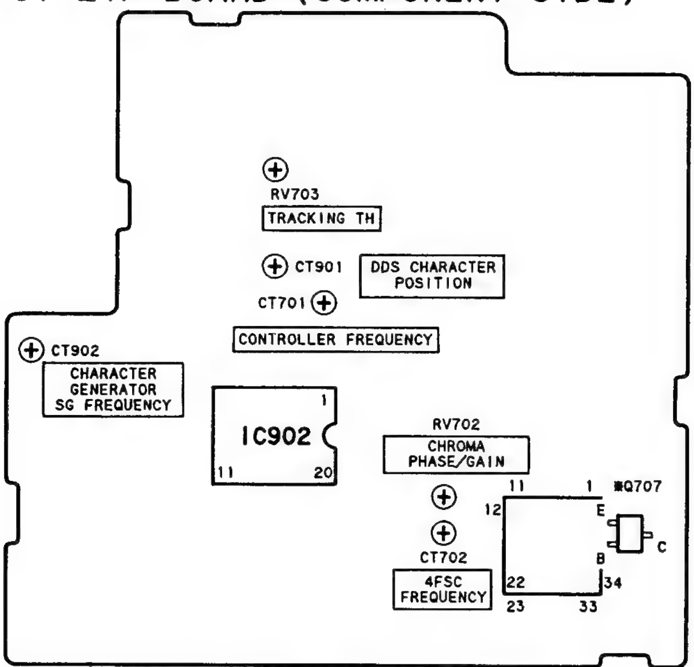
✱: Indicates a adjustment element mounted on the conductor side.

SS-100P BOARD (COMPONENT SIDE)



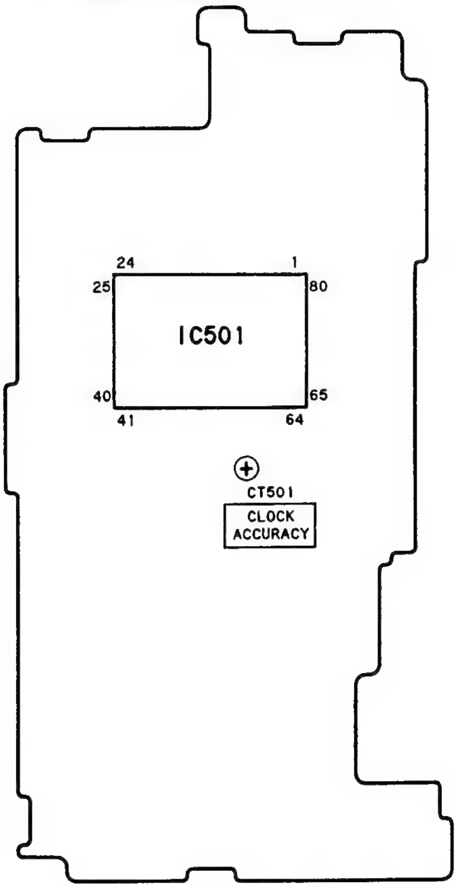
*: Indicates a adjustment element mounted on the conductor side.

CT-21P BOARD (COMPONENT SIDE)



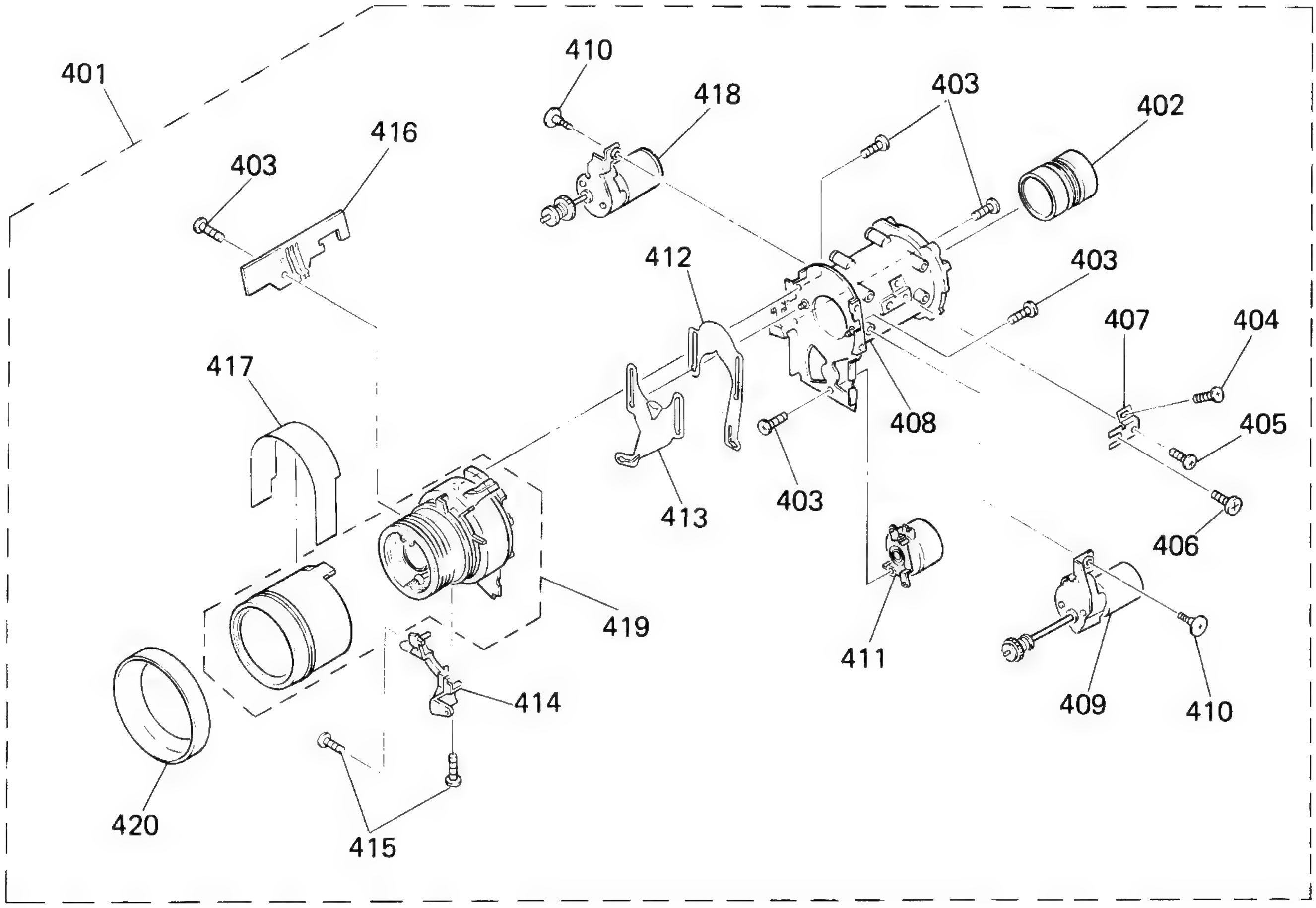
*: Indicates a adjustment element mounted on the conductor side.

FU-72P BOARD (COMPONENT SIDE)



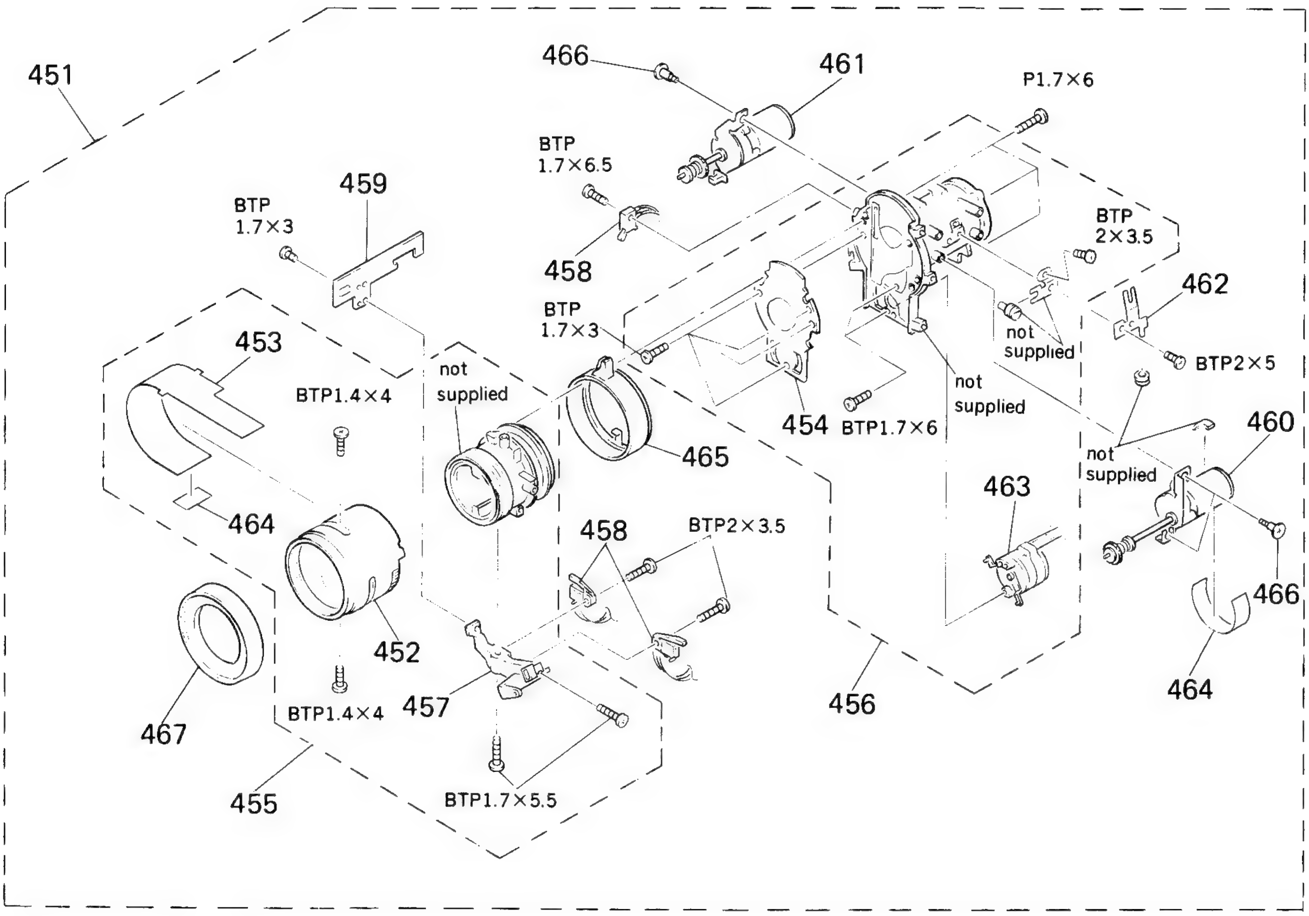
SECTION 5
EXPLODED VIEWS

5-9. ZOOM LENS ASSEMBLY (1) (VCL-8508XE)



Ref.No	Part No.	Description	Remarks
401	1-547-422-11	LENS, ZOOM (VCL-8508XE)	402-420
402	3-707-945-01	LENS ASSY, MASTER	
403	3-707-946-01	SCREW, (M3X4.5)	
404	3-707-947-01	SCREW, MASTER LENS (M4X4)	
405	3-707-948-01	SCREW, TRACKING PLATE (M3.8X2.8)	
406	3-707-949-01	TOP	
407	3-707-950-01	PLATE, FIXED	
408	3-707-951-01	MIRROR TUBE, REAR	
409	3-707-952-01	MOTOR ASSY, AF	
410	3-707-953-01	SCREW, F.Z MOTOR (M6.3X6.1)	
411	3-707-954-01	METER ASSY, IRIS	
412	3-707-955-01	SHUTTLECOCK (A), IRIS	
413	3-707-956-01	SHUTTLECOCK (B), IRIS	
414	3-707-957-01	BRACKET	
415	3-707-958-01	SCREW, BRACKET (M3.5X5)	
416	3-707-959-01	CHASSIS, SENSOR	
417	3-707-961-01	SHEET, F	
418	3-707-962-01	MOTOR ASSY, PZ	
419	3-707-963-01	FZ ASSY	
420	3-744-839-01	RING, CHANGE	

5-10. ZOOM LENS ASSEMBLY (2) (VCL-8508XF)



Ref.No	Part No.	Description	Remarks
451	1-547-412-12	LENS, ZOOM (VCL-8508XF)	452-467
452	3-707-965-01	RING ASSY (F)	
453	3-707-966-01	SHEET, (F) METER	
454	3-707-967-01	FRAME ASSY, 4 GROUP LENS	
455	3-707-968-01	MIRROR TUBE ASSY	
456	3-707-969-01	MIRROR TUBE ASSY, REAR	
457	3-707-970-01	BLACKET	
458	3-707-971-01	SW ASSY (Z)	
459	3-707-972-01	BOARD ASSY, SENSOR	

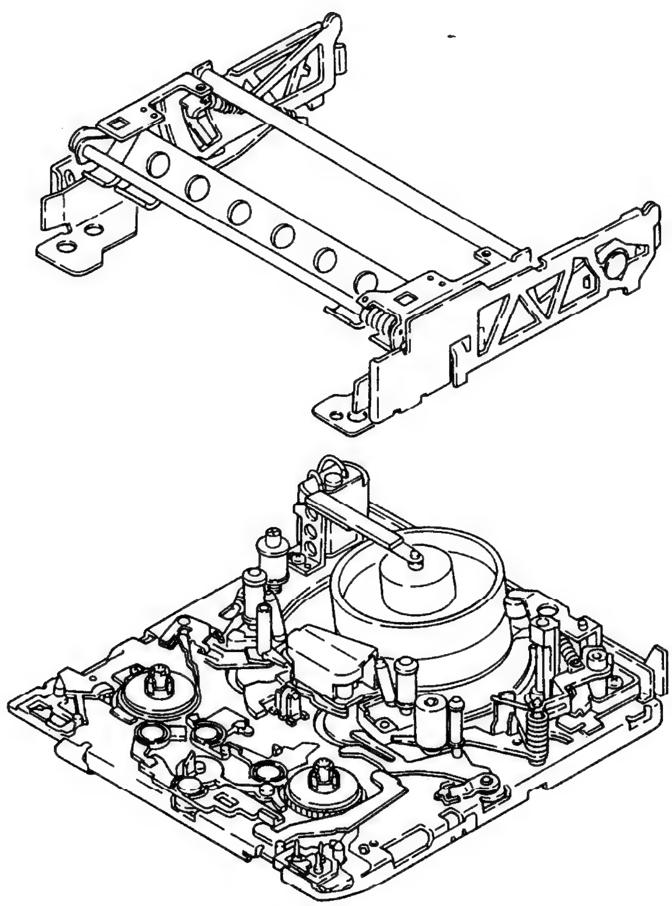
Ref.No	Part No.	Description	Remarks
460	3-707-973-01	MOTOR ASSY, AF	
460	3-708-059-01	MOTOR ASSY, AF (II)	
461	3-707-974-01	MOTOR ASSY, PZ	
462	3-707-975-01	RETAINER, (F) MOTOR	
463	3-707-976-01	METER ASSY, IRIS	
464	3-707-977-01	TAPE, POLYESTER	
465	3-707-978-01	RING ASSY, ZOOM	
466	3-707-796-01	SCREW, MOTOR SET	
467	3-707-839-01	RING, CHANGE	

mm Video MECHANICAL ADJUSTMENT MANUAL III

U MECHANISM

Video 8

Please use in conjunction with the SERVICE MANUAL.



8 MECHANISM DECK

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TABLE OF CONTENTS

Section	Title	Page
1.	PREPARATIONS FOR MECHANICAL BLOCK CHECK, ADJUSTMENT AND REPLACEMENT	
1-1.	Operation without Cassette Compartment Assembly and Tape	3
1-1-1.	How to Trigger the Loading Operation	3
1-1-2.	Setting the Playback Mode	3
1-1-3.	Eject Operation	3
1-2.	The Mode Selector	4
1-2-1.	Name of Each Part (external)	4
1-2-2.	Connections	4
1-2-3.	Handling	4
2.	PERIODICAL CHECK AND MAINTENANCE	
2-1.	Rotary Drum Assembly Cleaning	5
2-2.	Tape Path Cleaning	5
2-3.	Drive System Cleaning	5
2-4.	Periodical Check Items	6
2-5.	Servicing Tools	7
3.	MECHANICAL BLOCK CHECK, ADJUSTMENT AND REPLACEMENT	
3-1.	HC Roller Assembly	8
3-2.	Guide Guard Assembly	8
3-3.	DC Motor (Capstan Motor) Assembly	9
3-4.	S Brake, T Brake	10
3-5.	LB Brake, Axle Holding Pins	11
3-6.	LB Release Arm	12
3-7.	RK Stopper, RK Stopper Arms	12
3-8.	Pinch Arm Assembly, TG-7 Assembly	13
3-9.	TG-2 Assembly	14
3-10.	S Reel Table Assembly, T Reel Table Assembly	15
3-11.	Tension Regulator Band Assembly, Tension Regulator Arm Assembly	16
3-12.	Tension Regulator FWD Position Preset	17
3-13.	Drum Assembly, Dew Sensor	18
3-14.	Eject Lever, Switch Lever Assembly, Pinch Roller Sub Arm Assembly	19
3-15.	Timing Belt (L), RC Gear Assembly, Loading Lever Assembly, Timing Belt (S), Connecting Gear Assembly	20
3-16.	Idler Pulley, TS Brake Assembly, LB Gear Assembly, RK Gear Assembly	21
3-17.	UL Gear, UL Brake, UL Arm, LB Plate Spring	22
3-18.	Coaster (Right) Assembly, Drive Gear (Right) Assembly	23
3-19.	Coaster (Left) Assembly, Drive Gear (Left) Assembly	24
3-20.	Loading Motor, Brake Release Arm, Wheel Gear, Worm Assembly	25
3-21.	Rotary Upper Drum Replacement	26
3-22.	FWD Back Tension	27
3-23.	Reel Torque Check	27
4.	TAPE PATH ADJUSTMENT	
4-1.	Track Shift Mode Setting	28
4-2.	Preparations for Adjustment	29
4-3.	Tracking Adjustment	30
4-4.	Tracking Fine Adjustment	30
4-5.	No.2 Guide (TG-2) Adjustment	30
4-5-1.	No.2 Guide (TG-2) Height Presetting	30
4-5-2.	No.2 Guide (TG-2) Adjustment	31
4-6.	No.7 Guide (TG-7) Adjustment	31
4-7.	Cue and REV Waveform Check	31
4-8.	Check After Adjustment	32
4-8-1.	Tracking Check	32
4-8-2.	Rising Check	32
4-8-3.	Tape Path Check	32

1. PREPARATIONS FOR MECHANICAL BLOCK CHECK, ADJUSTMENT AND REPLACEMENT

Note: For removal of the cabinet, the boards, the cassette compartment, etc., refer to the service guides.

1-1. OPERATION WITHOUT CASSETTE COMPARTMENT ASSEMBLY AND TAPE

Note: The unit will not work if exposed to a strong light.

1-1-1. How to Trigger the Loading Operation (See Fig. 1-1.)

1) Supply power to the unit after removing the cabinet, the camera block, the cassette compartment assembly, etc., as indicated in the service guides. (This will enable operation of the mechanical deck.)
2) Cover the LED assembly with an opaque cap, etc. ❶.
3) Attach a piece of tape to the RECOG switch ❷ so that the pin is held down.
4) Push the EJECT lever ❸ in the direction of the arrow Ⓐ.

1-1-2. Setting the Playback Mode (See Fig. 1-1.)

1) Follow the procedures in section 1-1-1. above.
2) Put the rubber band ❹ around the S and T reels.
3) Press the PLAY switch of unit, then push the tension regulator arm assembly ❺ in the direction of the arrow Ⓑ when the T reel starts to rotate (the tension regulator band will be released, and the S reel will start rotating).
4) To stop operation, press the STOP switch.

1-1-3. Eject Operation (See Fig. 1-1.)

1) To eject, turn the EJECT switch on.

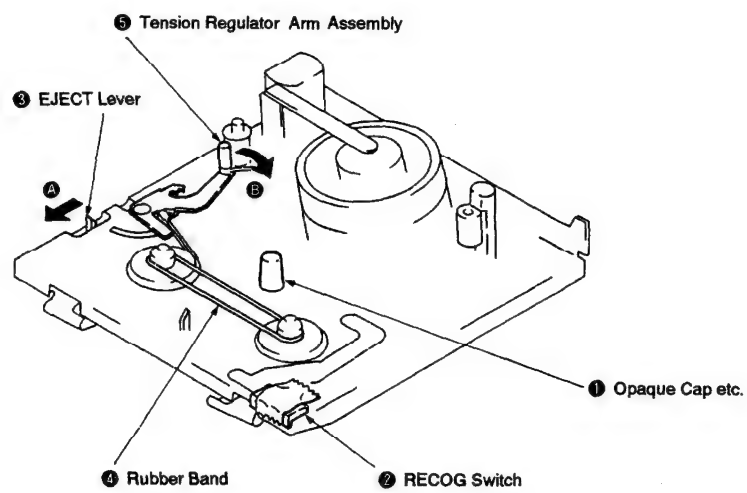


Fig. 1-1.

1-2. THE MODE SELECTOR

1-2-1. Name of Each Part (external) (See Fig. 1-2.)

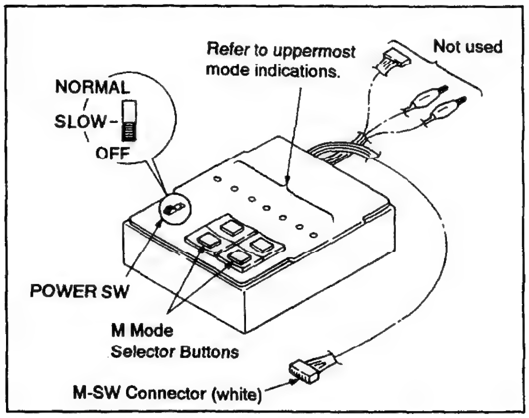


Fig. 1-2.

1-2-2. Connections (See Fig. 1-3.)

1) Mount the MODE SELECTOR III panel (Ref. No. J-9) ❶ onto the mode selector.
2) Attach the conversion connector (Ref. No. J-8) ❸ of MODE SELECTOR III to the 6-pin connector (white) ❷ of the mode selector M-SW.
3) Remove the FP-89 flexible board ❺ from the flexible connector ❹.
4) Attach the FP-89 flexible board ❺ to the flexible connector ❻ of the MODE SELECTOR III conversion connector ❸, then attach the 2-pin connector (white) ❽ of the loading motor to the 2-pin connector (white) ❼.

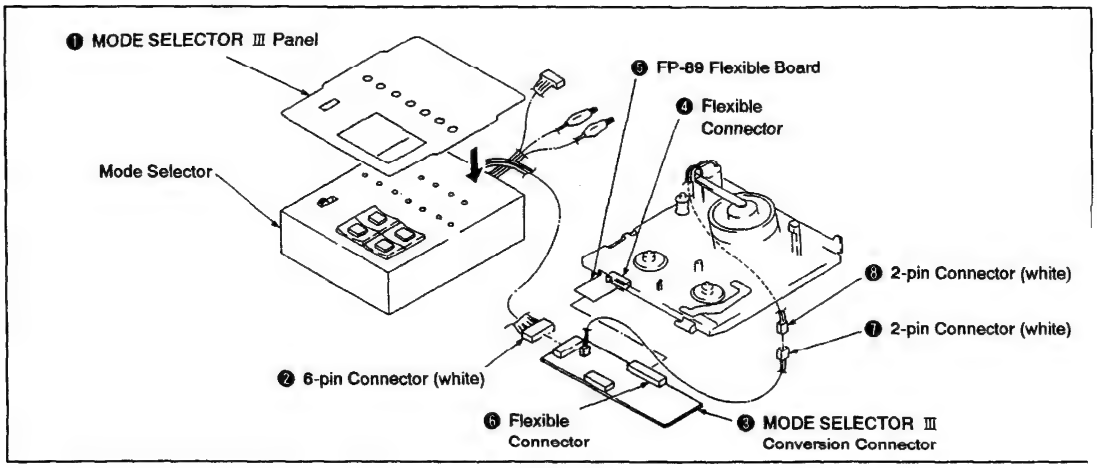


Fig. 1-3.

1-2-3. Handling (See Figs. 1-2. and 1-4.)

- Use only the M mode selector buttons.
- Refer to mode indications on the uppermost part of the MODE SELECTOR III panel.
- If the right M mode selector button is kept pressed, the lit indication will change in the order of EJECT → (IA) → ULD → (IB) → STOP → (IC) → FWD.
- To change modes in the reverse direction (from FWD to EJECT), press the left selector button.

Note: For this U mechanism, the uppermost indicators on the MODE SELECTOR III panel are used. The IA, IB and IC indications light up during mode changes.

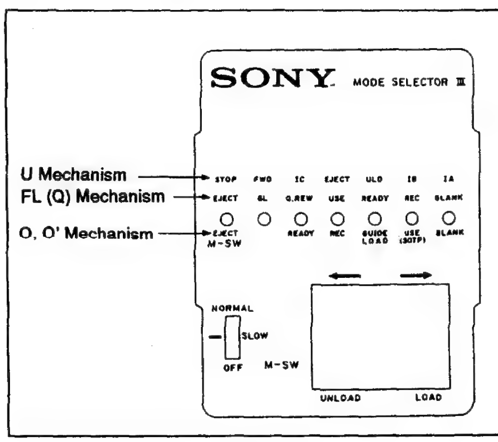


Fig. 1-4.

2. PERIODICAL CHECK AND MAINTENANCE (See Fig. 2-1.)

The following periodical check and maintenance procedures are necessary to ensure proper operation and to protect the tapes as well as the unit, and the following maintenance procedures must be always carried out after repairing regardless of how long the unit has been used.

2-1. ROTARY DRUM ASSEMBLY CLEANING

1) While pressing a piece of chamois leather (Ref. No. J-2) moistened in cleaning fluid (Ref. No. J-1) lightly against the rotary drum, turn the rotary upper drum slowly counter-clockwise with your fingers.

Note: Do not drive the drum with the motor, and do not turn it clockwise.
Do not move the chamois leather vertically against the head tip; this can damage the head tip. Strictly follow the cleaning instructions above.

2-2. TAPE PATH CLEANING

1) Set the cassette compartment assembly to the eject state, or remove it. Then clean the tape path (guides No. 1 to 7, capstan shaft, pinch rollers) with a piece of chamois leather moistened in cleaning fluid (See Fig. 2-1).

2-3. DRIVE SYSTEM CLEANING

1) Clean the drive system (timing belt, reel table surface) with a piece of cloth moistened in cleaning fluid.

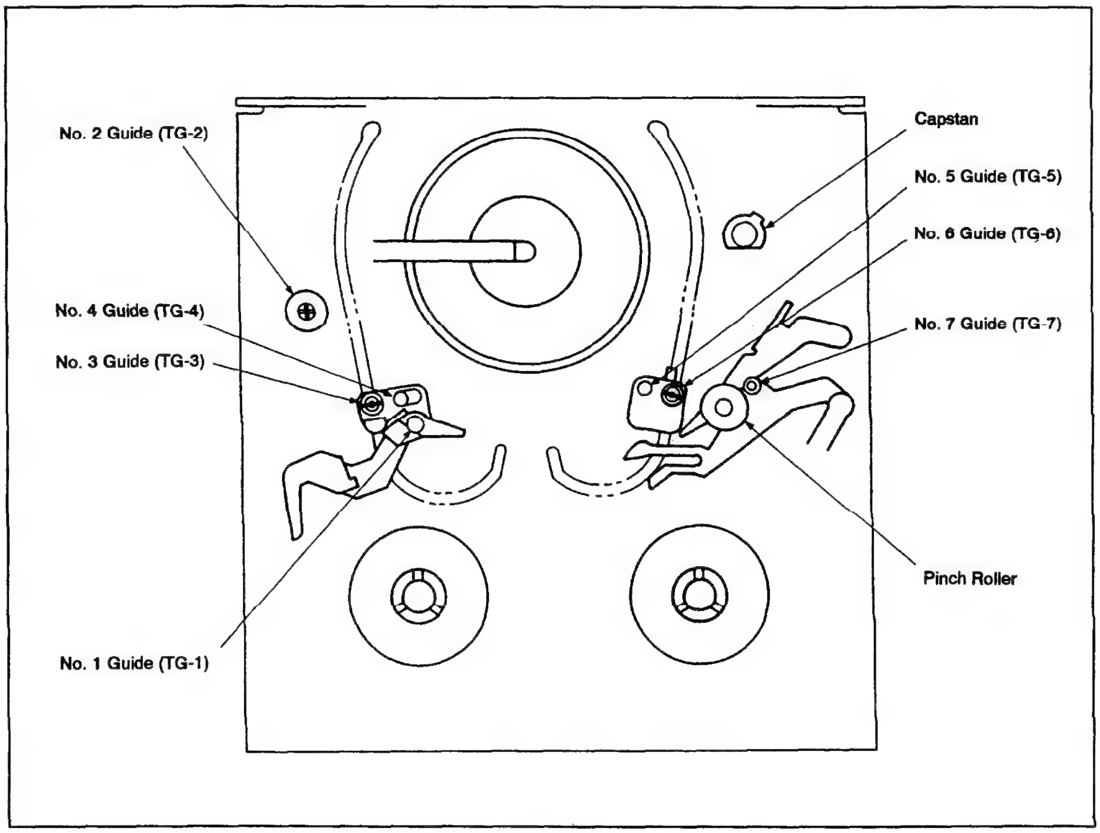


Fig. 2-1.

2-4. PERIODICAL CHECK ITEMS

○ Cleaning ◎ Lubrication ☆ Check

Maintenance and Check Item		Operation time (H)										Remarks
		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	
Cleaning and Demag-netizing	Tape path surfaces Cleaning	○	○	○	○	○	○	○	○	○	○	Do not oil.
	Rotary drum assembly cleaning and demagnetizing	○	○	○	○	○	○	○	○	○	○	Do not oil.
Drive System	Relay belt (short)	–	☆	–	☆	–	☆	–	☆	–	☆	3-728-866-01
	Relay belt (long)	–	☆	–	☆	–	☆	–	☆	–	☆	3-728-865-01
	Capstan shaft	–	◎	–	◎	–	◎	–	◎	–	◎	Take care that no oil gets on tape path surfaces.
	Idler pulley axle	–	◎	–	◎	–	◎	–	◎	–	◎	
	Loading motor	–	☆	–	☆	–	☆	–	☆	–	☆	1-541-612-11
Perfor-mance Check	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	–	☆	–	☆	–	☆	–	☆	–	☆	
	Brake system	–	☆	–	☆	–	☆	–	☆	–	☆	
	FWD, RVS torque measurement	–	☆	–	☆	–	☆	–	☆	–	☆	

Notes: When overhauling the unit, perform parts replacement referring to the table above.

Regarding Oil:

- Always use the specified oil (using oil of different viscosity, etc. can cause troubles of several kinds).
  Specified oil: Part No. 7-661-018-01
  (Mitsubishi Diamond Oil Hydrofluid EP56)
- Be sure that no dirt is mixed in the oil to be used on axle bearings. Use of dirty oil can result in bearing wear and burning.
- By "one drop of oil" is meant the quantity of oil adhering to the end of a a 2mm-diameter rod as shown in Fig. 2-2.

On grease:

- Use the specified grease.
  Grease: Part No. 7-662-010-08
  (Sony grease SGL-701)

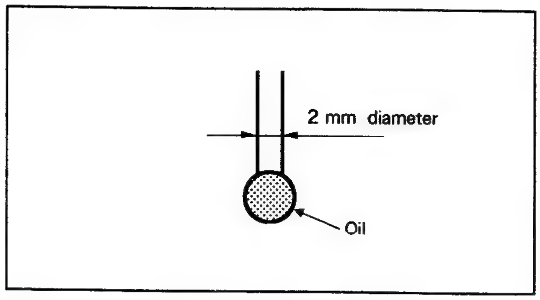
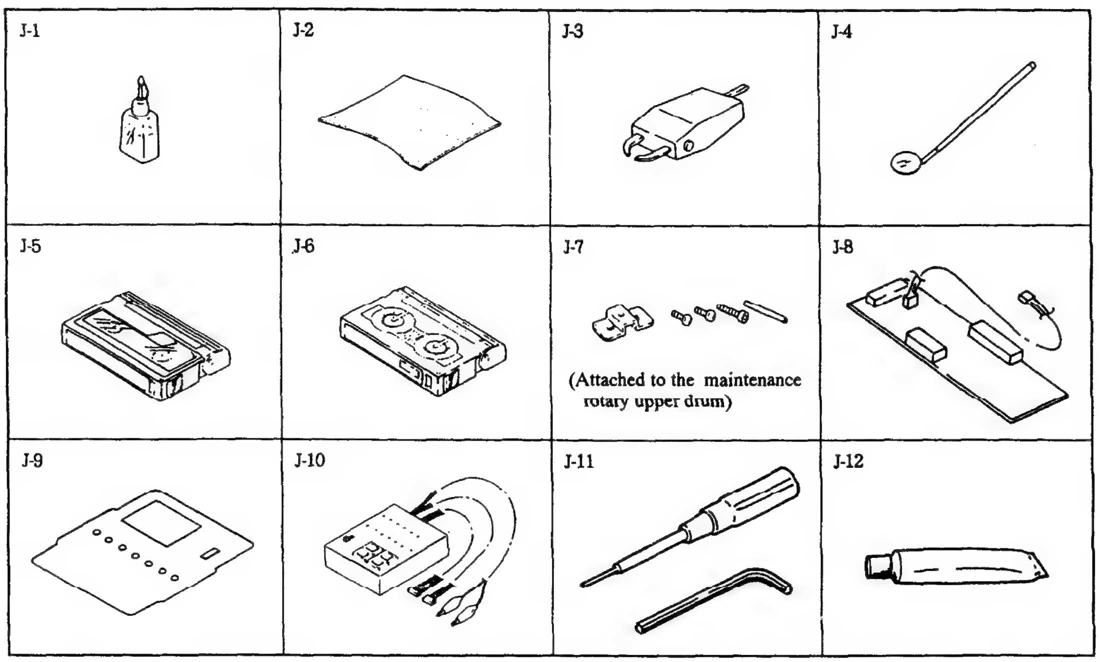


Fig. 2-2.

2-5. SERVICING TOOLS

Ref. No.	Name	Part Code	Marking	Application, etc.
J-1	Cleaning fluid	Y-2031-001-0	–	
J-2	Chamois cloth	2-034-697-00	–	
J-3	Head demagnetizer	Commercially available	–	
J-4	Dental mirror Spare mirror	J-6080-029-A J-6080-030-1	SL-5052	Tape path
J-5	Alignment tape NTSC (WR5-1N) PAL (WR5-1C)	8-967-995-01 8-967-995-06		Tape path
J-6	FWD/RVS takeup torque cassette	J-6080-624-A	GD-2086	
J-7	Rotary drum jig	(Attached to the maintenance rotary upper drum)		
J-8	Mode selector III conversion connector	J-6082-021-A		General
J-9	Mode selector III panel	J-6082-023-A		General
J-10	Mode selector	J-6080-825-A		General
J-11	Hexagonal wrench detection (0.89 mm) or L wrench (0.89 mm)	7-700-766-01 7-700-736-06		Tape path
J-12	Sony grease (SGL-701)	7-662-010-08		

Other devices: Oscilloscope
Analog tester (20 kΩ)



3. MECHANICAL BLOCK CHECK, ADJUSTMENT AND REPLACEMENT

Notes:
- Use the mode selector (Ref. No. J-10) for procedures in this chapter.
- Modes within a frame [ ] are those set by pressing the buttons of the mode selector.

3-1. HC ROLLER ASSEMBLY

1. Removal (See Fig. 3-1.)
1) Remove the screw ❶, then remove the HC roller assembly ❷.

2. Installation (See Fig. 3-1.)
1) Align the two dowels ❸ attached to the HC roller assembly ❷ with the two holes ❹ in the mechanism chassis.
2) Secure the HC roller assembly ❷ with the screw ❶.

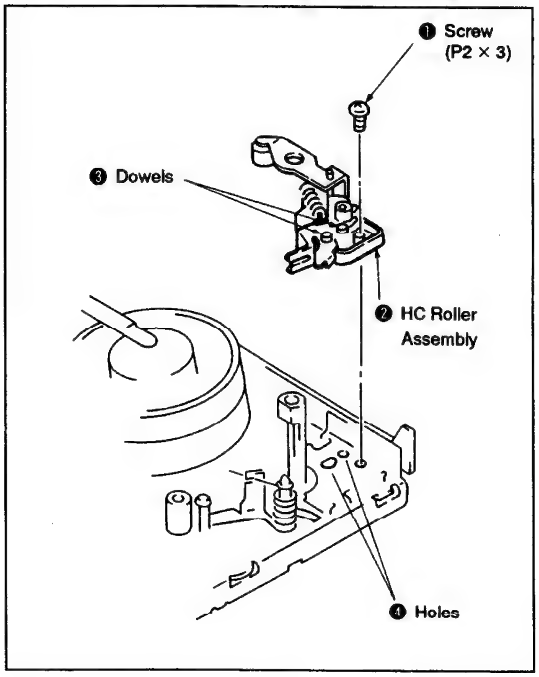


Fig. 3-1.

3-2. GUIDE GUARD ASSEMBLY

1. Removal (See Fig. 3-2.)
Remove the screw ❶, then remove the guide guard assembly ❷.

2. Installation (See Fig. 3-2.)
1) Align the dowel ❸ attached to the guide guard assembly ❷ with the hole ❹.
2) Secure the guide guard assembly ❷ with the screw ❶.

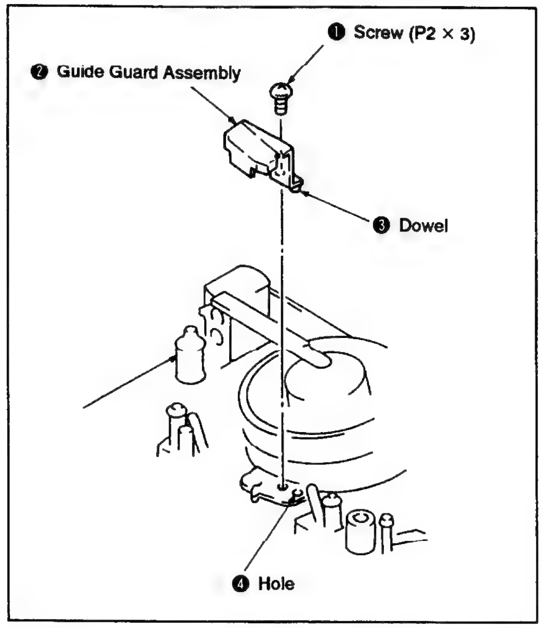


Fig. 3-2.

3-3. DC MOTOR (CAPSTAN MOTOR) ASSEMBLY

1. Removal (See Fig. 3-3.)

1) Set the ULD mode.
2) Turn the stopper ❶ in the direction of the arrow Ⓐ as far as it will go.
3) Remove the two screws ❷, then remove the DC motor ❸.

2. Installation (See Fig. 3-3.)

1) Align the two screwed dowels ❹ with the two holes ❺, then engage the toothed part ❻ with the connecting gear ❼.
2) Secure the DC motor assembly ❸ with the two screws ❷.
3) Turn the stopper ❶ in the direction of the arrow Ⓑ as far as it will go.

Note:
- When engaging the gears, take care not to damage their teeth.
- Do not leave any clearance between the DC motor ❸ and the chassis.
- Do not touch the capstan motor axle*, the oil seal* and the rotor*.

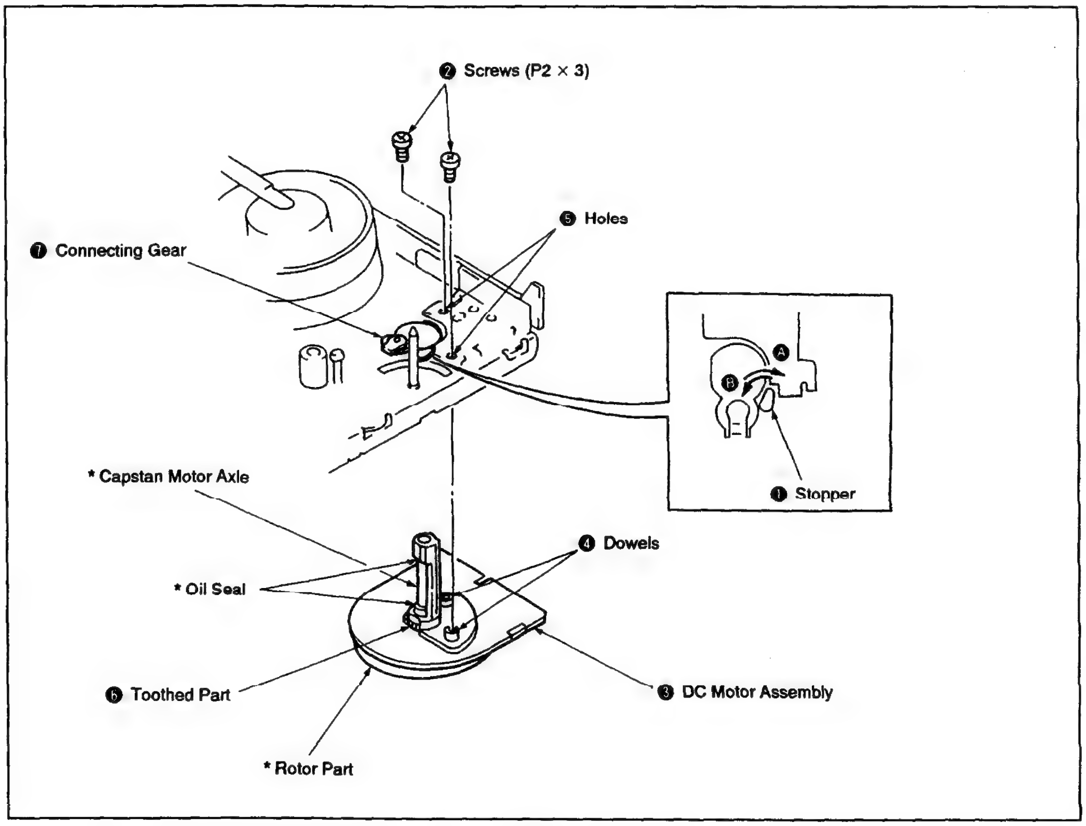


Fig. 3-3.

3-4. S BRAKE, T BRAKE

1. Removal (See Fig. 3-4.)

1) Remove the torsion coil spring (ST) ❶.
2) Remove the axle holding pin ❷, then remove the T brake ❸.
3) Remove the axle holding pin ❹, then remove the S brake ❺.

2. Installation (See Fig. 3-4.)

1) While fitting the toothed part ❻ into the notch ❼, mount the S brake ❺.
2) Insert the axle holding pin ❹.
3) Insert the axle ❽ to the S reel side of the brake release arm ❾ so that the Ⓐ part comes closer to the drum than part Ⓑ, and mount the T brake ❸.
4) Insert the axle holding pin ❷.
5) Insert the torsion coil spring (ST) ❶ below the claw ⓫ of the axle ❿, then hook it to two claws ⓬.

Note: Confirm that the claws of axle holding pins ❷ and ❹ are not broken before assembling.

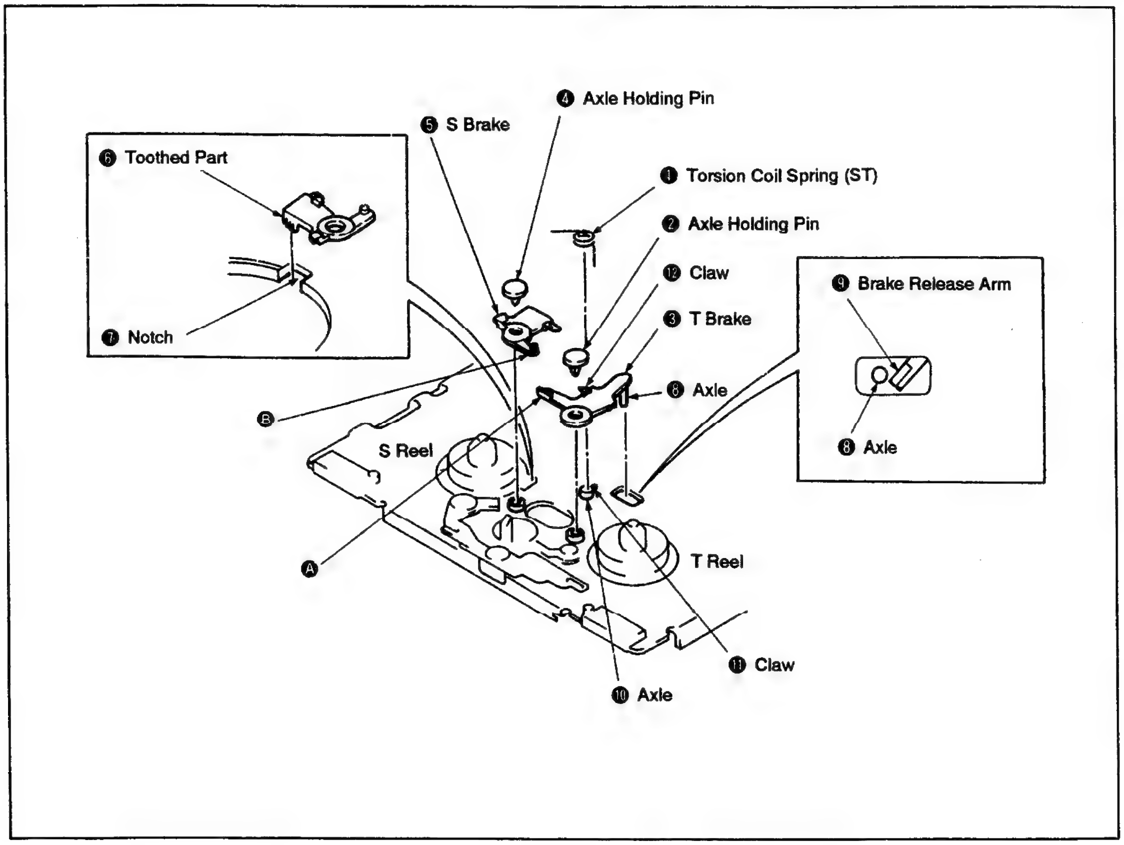


Fig. 3-4.

3-5. LB BRAKE, AXLE HOLDING PINS

1. Removal (See Fig. 3-5.)

1) Remove the screw ❶, then remove the TL holding plate ❷.
2) Remove the axle holding pin ❸, then remove the LB brake ❹.
3) Remove the axle holding pin ❺, then remove the LB lever ❻.

2. Installation (See Fig. 3-5.)

1) Mount the LB lever ❻ matching it to pin ❼ of the LB gear, then secure it with the axle holding pin ❺.
2) Insert the pin ❽ into the notch ❾ of the LB lever ❻, then mount the LB brake ❹ while inserting the toothed part ❿ into the notch ⓫.
3) Insert the axle holding pin ❸.
4) Align the dowel ⓬ with the hole ⓭, then mount the TL holding plate and secure it with the screw ❶.

Note: Confirm that the claws of axle holding pins ❸ and ❺ are not broken before assembling.

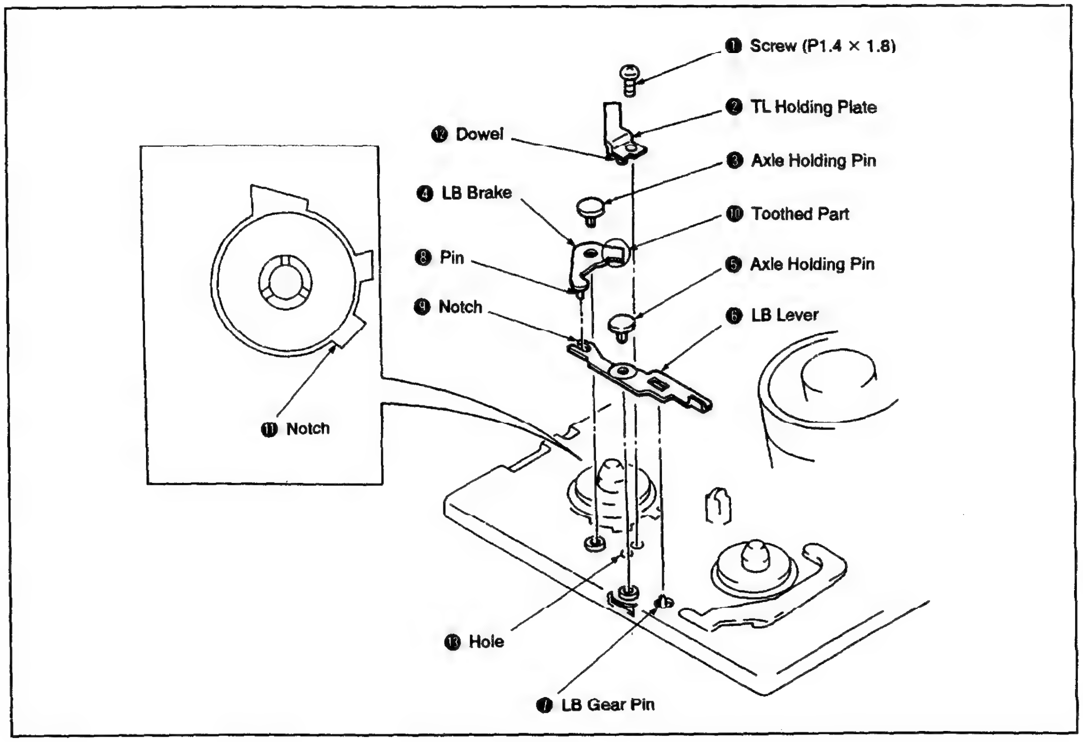


Fig. 3-5.

3-6. LB RELEASE ARM

1. Removal (See Fig. 3-6.)

1) While pushing the claw ❶ in the direction of the arrow, remove the LB release arm ❷.

2. Installation (See Fig. 3-6.)

1) Fit the LB release arm ❷ to the axle ❸, insert protrusions ⓐ, ⓑ, ⓒ, ⓓ into the three holes ❹, then secure with the claw ❶.

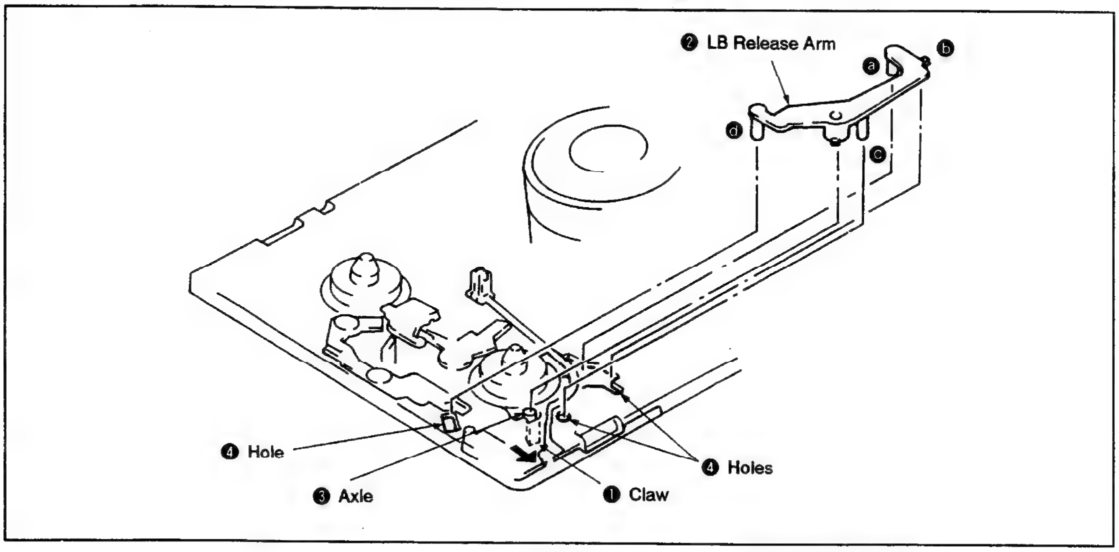


Fig. 3-6.

3-7. RK STOPPER, RK STOPPER ARMS

1. Removal (See Fig, 3-7.)

1) Remove the torsion coil spring (RK) ❶.
2) Open the chassis claw ❷, then remove the RK stopper arm ❸.
3) Remove the RK stopper ❹.

2. Installation (See Fig. 3-7.)

1) Mount the RK stopper ❹ onto the axle ❺.
2) Mount the RK stopper arm ❸ onto the axle ❻, insert Pin ❿ into hole ⓫, then hook the claw ❷ of the chassis to the hole ❼.
3) Insert the torsion coil spring (RK) ❶ into the axle ❺, then hook it to claws ❽ and ❾.

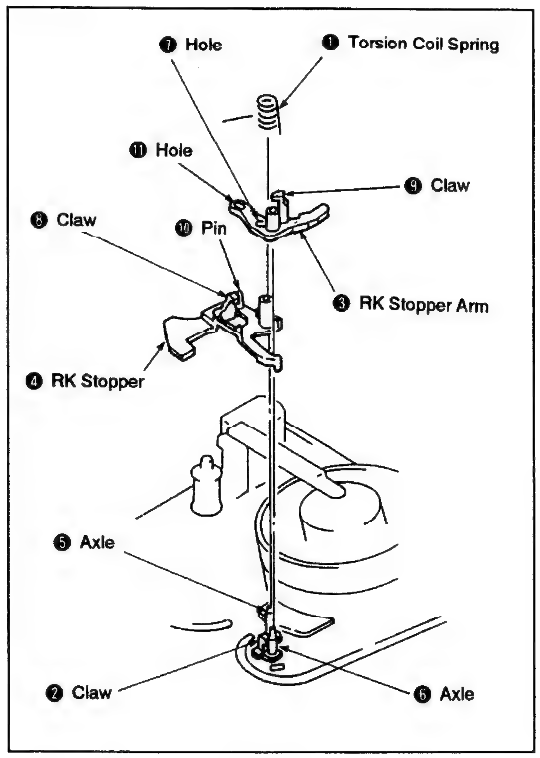


Fig. 3-7.

3-8. PINCH ARM ASSEMBLY, TG-7 ASSEMBLY

1. Removal (See Fig. 3-8.)

1) Set the [IB] mode.
2) Remove the stopper washer ❶, then remove the pinch arm assembly ❷.
3) Bend the claw ❹ inside hole ❸ in the direction of the arrow using a thin screwdriver or the like, then remove the TG-7 plate spring ❺.
4) Remove the TG-7 arm assembly ❻.

2. Installation (See Fig. 3-8.)

1) Grease the inner surfaces of hole ❼ (See Fig. A).
2) Insert the axle ❽ of the TG-7 arm assembly ❻ into the hole ❼.
3) Grease the shaded section ⓐ (See Fig. A).
4) Insert the TG-7 plate spring ❺ into the hole ❸, then secure it with the claw ❹.
5) Apply half a drop of oil to the axle ❾ (See Fig. B).
6) Fit the pinch arm assembly ❷ to the axle ❾ and insert the pinch roller sub arm assembly tab ❿ into the ⓑ part.
7) Install the stopper washer ❶.

Note:
- Take care not to grease the screw ⓫ of the TG-7 arm assembly ❻ (See Fig. A).
- When fitting the pinch arm assembly ❷ to the axle ❾, make sure that it does not touch the TG-7 guide ⓬ or the rubber roller ⓭.
- After assembling, be sure to perform tape path adjustment as described in section 4.

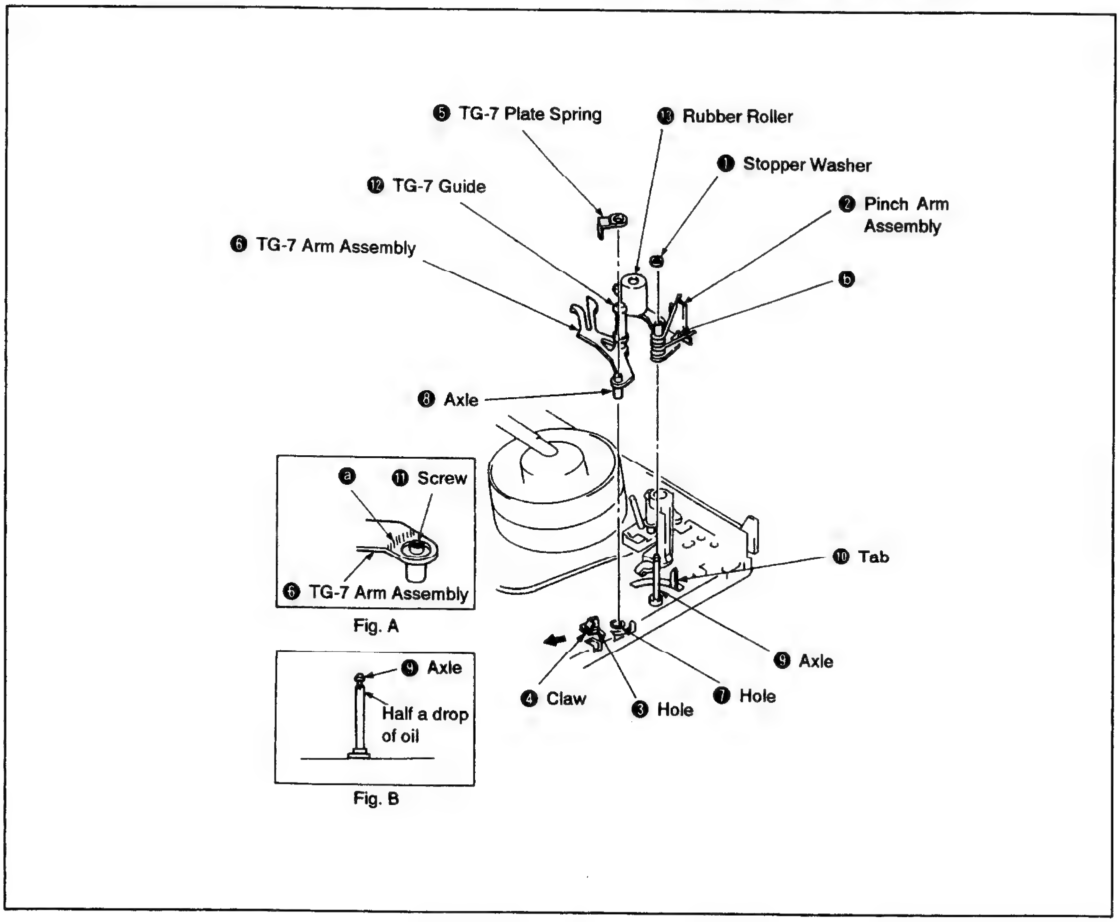


Fig. 3-8.

3-9. TG-2 ASSEMBLY

1. Removal (See Fig. 3-9.)

1) Remove the TG-2 upper flange assembly ❶.
2) Remove the TG-2 roller ❷, the TG-2 sleeve ❸, the TG-2 lower flange ❹ and the compression spring ❺.

2. Installation (See Fig. 3-9.)

1) Mount the compression spring ❺, the TG-2 lower flange ❹, the TG-2 sleeve ❸ and the TG-2 roller ❷ to the axle.
2) Secure the TG-2 upper flange ❶ to the axle by rotating it 4 to 6 turns.

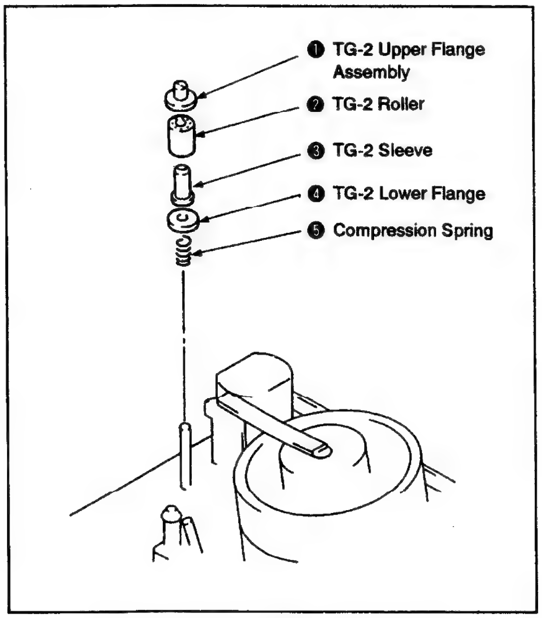


Fig. 3-9.

3. TG-2 Height Preset (see Fig. 3-10.)

1) Adjust height from the mechanism chassis upper surface to the TG-2 upper flange ❶ upper surface to 18.6 mm by turning the TG-2 upper flange ❶.

Note: After adjustment, be sure to perform tape path adjustment as described in section 4.

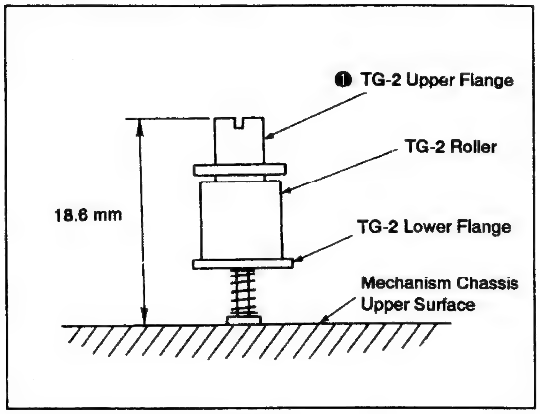


Fig. 3-10.

3-10. S REEL TABLE ASSEMBLY, T REEL TABLE ASSEMBLY

1. Removal (See Fig. 3-11.)

1) Remove the S brake and T brake as described in section 3-4.
2) Remove the TL holding plate as described in section 3-5.
3) Remove the tension regulator band assembly as described in section 3-11.
4) Remove the S reel table assembly ❶.
5) Turn the stopper ❷ approx. 90° in the direction of the arrow Ⓐ.
6) While sliding the LB release arm ❸ in the direction of the arrow Ⓑ, remove the T reel table assembly ❹.

2. Installation (See Fig. 3-11.)

1) Apply half a drop of oil to the axle ❺ (See Fig. A).
2) Move the RK gear ❻ in the direction of the arrow Ⓒ and the TS brake ❼ in the direction of the arrow Ⓓ, putting them out of the way.
3) While sliding the LB release arm ❸ in the direction of the arrow Ⓑ, mount the T reel table assembly ❹ onto the axle ❺, then turn the stopper ❷ in the direction of the arrow Ⓔ as far as it will go.
4) Apply half a drop of oil to the axle ❽ (See Fig. B).
5) Move the RK gear ❻ in the direction of the arrow Ⓕ, the UL brake ❾ in the direction of the arrow Ⓖ and the LB brake ❿ in the direction of the arrow Ⓗ, putting them out of the way.
6) Mount the S reel table ❶ onto the axle ❽.
7) Mount the tension regulator band assembly as described in section 3-11.
8) Mount the TL holding plate as described in section 3-5.
9) Mount the S brake and T brake assemblies as described in section 3-4.

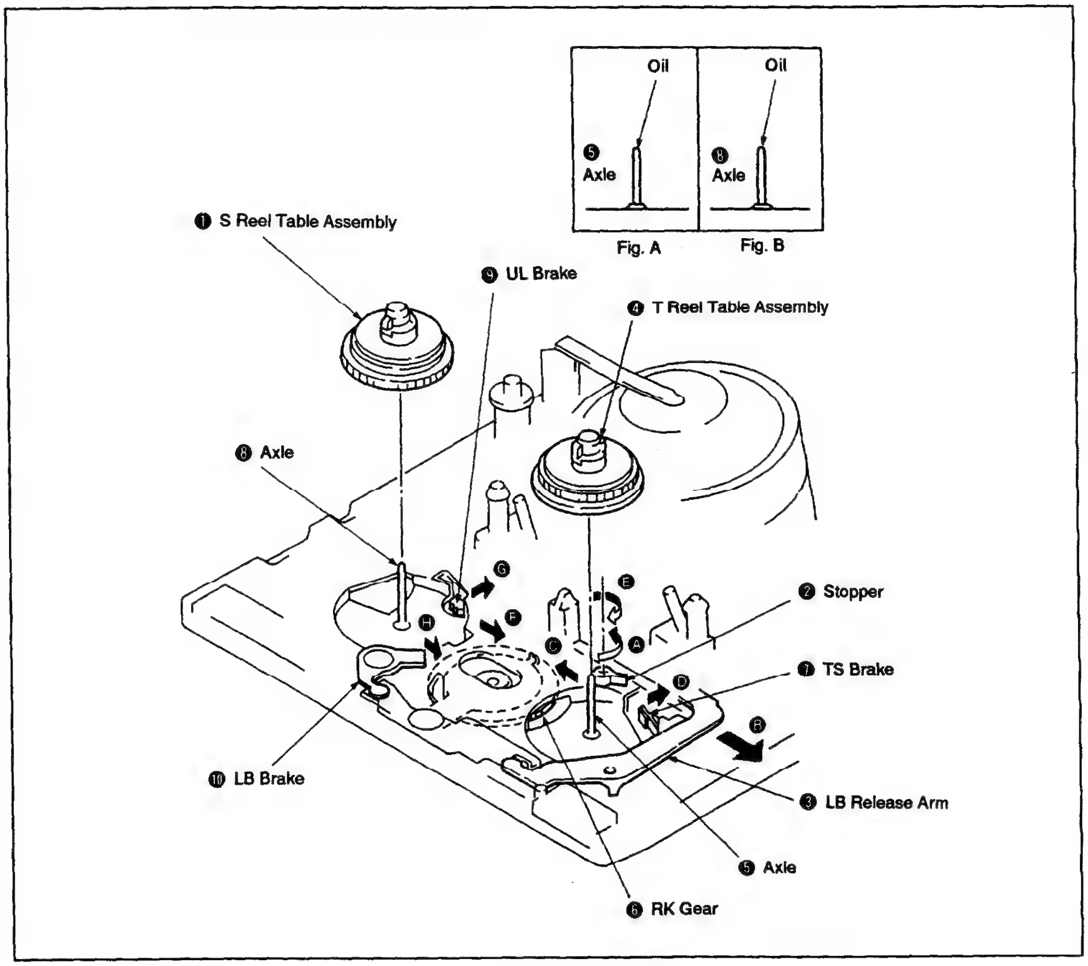


Fig. 3-11.

3-11. TENSION REGULATOR BAND ASSEMBLY, TENSION REGULATOR ARM ASSEMBLY

1. Removal (See Fig. 3-12.)

1) Remove the TL holding plate as described in section 3-5.
2) Remove the screw ❶.
3) Using a thin screwdriver or the like, remove the tension regulator band assembly ❹ from the axle ❸ of tension regulator arm assembly ❷.
4) Remove the tension spring ❺.
5) Remove the stopper washer ❻ from the back of the mechanism chassis, then remove the tension regulator arm assembly ❷.
6) Open the claw ❼, then remove the adjust arm ❽.

Note: When removing the tension regulator band assembly ❹, take care not to twist or bend it, and not to touch the felt surface ❾.

2. Installation (See Fig. 3-12.)

1) Engage the adjust arm ❽ in the position shown in Fig. A, then close the claw ❼.
2) Apply half a drop of oil to the hole ❿.
3) Mount the tension regulator arm assembly ❷, then insert it into the slot ⓫ so that the ⓐ part comes to the arrow Ⓐ side of the switch lever assembly (See Fig. B).
4) While holding the tension regulator arm assembly ❷ from the mechanism chassis front, secure it with the stopper washer ❻ from the back.
5) Hook the R hook of the tension spring ❻ to the adjust arm ❽ as shown in the figure, then hook the opposite end to the tension regulator arm assembly ❷.
6) Mount the tension regulator band assembly ❹ onto the axle ❸ of tension regulator arm assembly ❷, and place it so that the felt surface ❾ comes against the shaded portion of the S reel table assembly ⓬.
7) Mount the tension regulator plate ⓭ of the tension regulator band assembly ❹ so that it is aligned with the dowel ⓮ of the mechanism chassis, then secure it temporarily with the screw ❶.
8) Mount the TL holding plate as described in section 3-5.
9) Adjust tension regulator FWD position as described in section 3-12.
10) Perform adjust arm adjustment as described in section 3-22.

Note: When mounting the tension regulator band assembly ❷, take care not to twist or bend it, and not to touch the felt surface ❾.

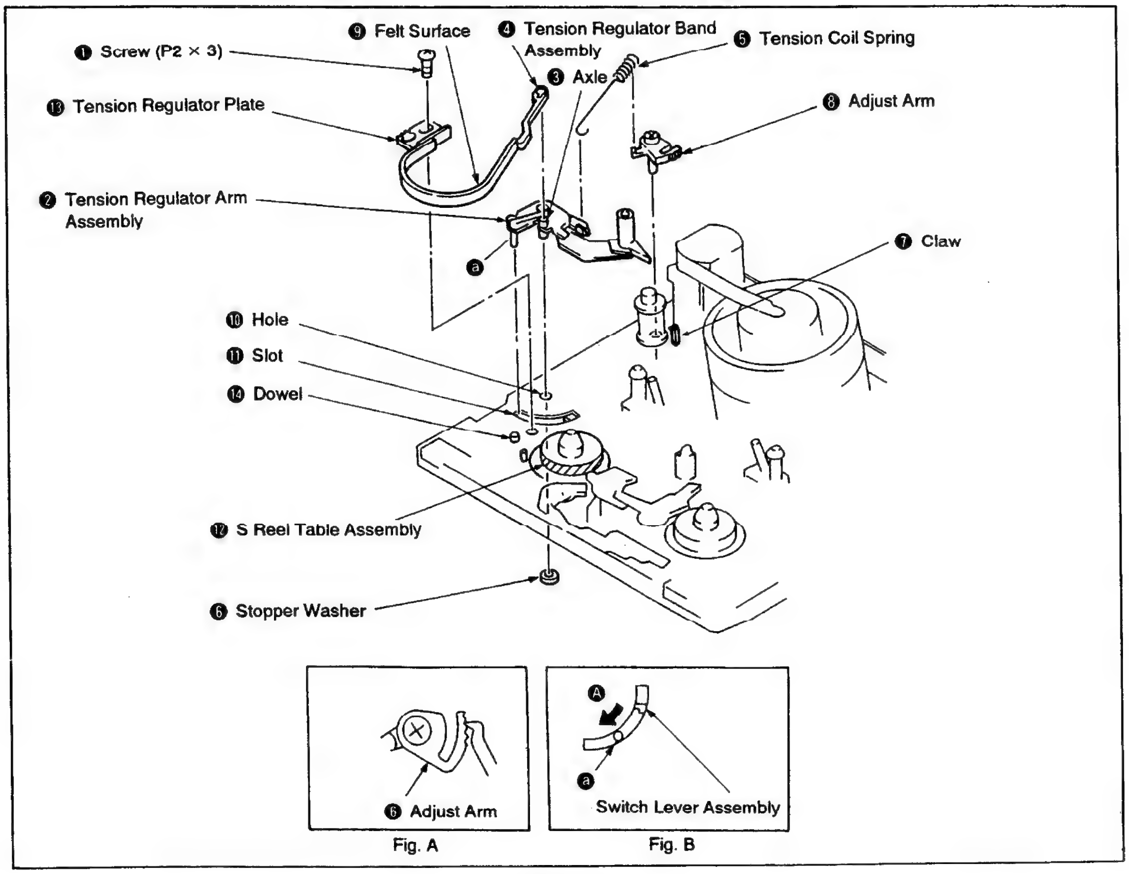


Fig. 3-12.

3-12. TENSION REGULATOR FWD POSITION PRESET (See Fig. 3-13.)

1) Load a cassette tape and set the FWD mode.
2) Confirm whether the distance between ⓐ part of the tension regulator arm ❶ and the groove ❷ of the chassis is 1.1 ± 0.3 mm. If this distance is not within the specified range, remove the cassette tape and perform the following adjustment.
3) Loosen the fixing screw ❹ of the tension regulator band assembly ❸.
4) Slide the tension regulator plate ❺ in the direction of the arrow Ⓐ if the measured distance is over the specified range, and in the direction of the arrow Ⓑ if it is under that range. Then, fix it with the screw ❹.
5) Repeat steps 1) and 2) and confirm that the distance is within the specified range.

Note: Use a cassette with the tape advanced halfway.

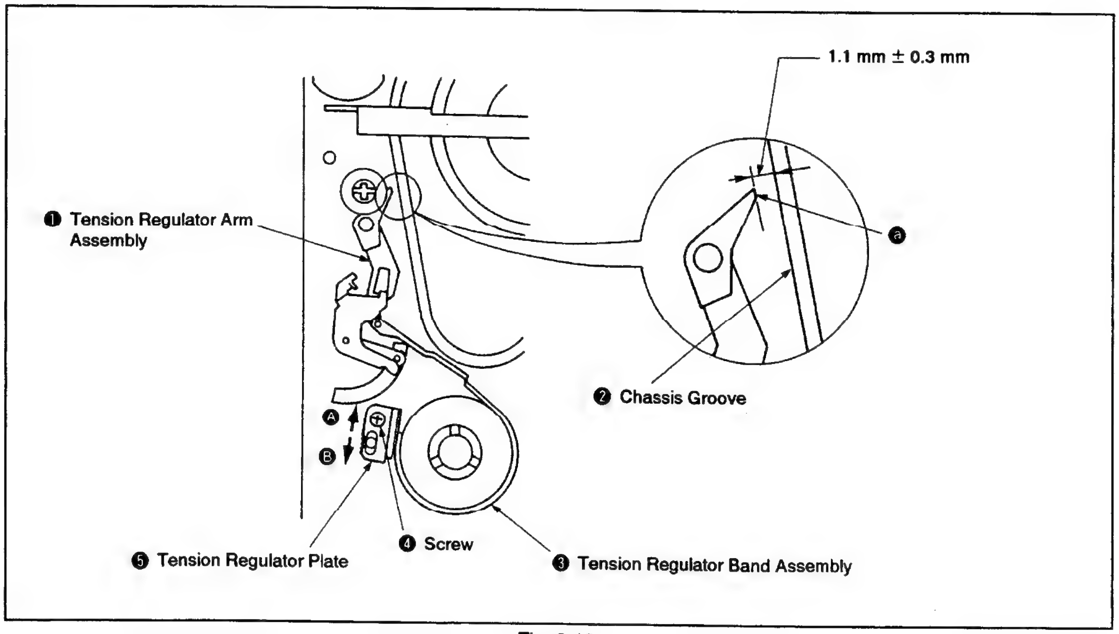


Fig. 3-13.

3-13. DRUM ASSEMBLY, DEW SENSOR

1. Removal (See Fig. 3-14.)

1) Set the [EJECT] mode.
2) Remove the flexible board ❶ and the two connectors ❷.
3) Remove the guide guard assembly as described in section 3-2.
4) Remove the screw ❸, then remove the axle ground terminal ❹.
5) Remove the three screws ❺, then remove the drum assembly ❻ from the mechanism chassis.
6) Remove the connector ❿
7) Remove the screw ❼, then remove the dew sensor ❽.

Note:
- When removing the drum assembly ❻ from the mechanism chassis, take care not to cut the flexible board ❶ or the harness.
- Take care not to touch the head tip ❾.

2. Installation (See Fig. 3-14.)

1) Insert part ⓐ of the dew sensor ❽ into the notch ⓫ of the mechanism chassis, then secure it with the screw ❼.
2) Mount the connector ❿.
3) Clamp the harness ⓯ of the dew sensor ❽ with the reinforcing the claw ⓰ of the plate SS assembly (See Fig. A).
4) Insert the connector ❷ and the flexible board ❶ into the hole ⓬ of the mechanism chassis, align the drum assembly ❻ with the two dowels ⓭ and secure it with the three screws ❺.
5) Align the axle ground terminal ❷ with the two dowels ⓮ of the mechanism chassis and secure it with the screw ❸.
6) Mount the guide guard assembly as described in section 3-2.
7) Mount the two connectors ❷ and the flexible board ❶.

Note:
- Take care not to cut the flexible board ❶ or the harness ⓯.
- Take care not to touch the head tip ❾.
- After assembling, be sure to perform Tape Path Adjustment following instructions in section 4.

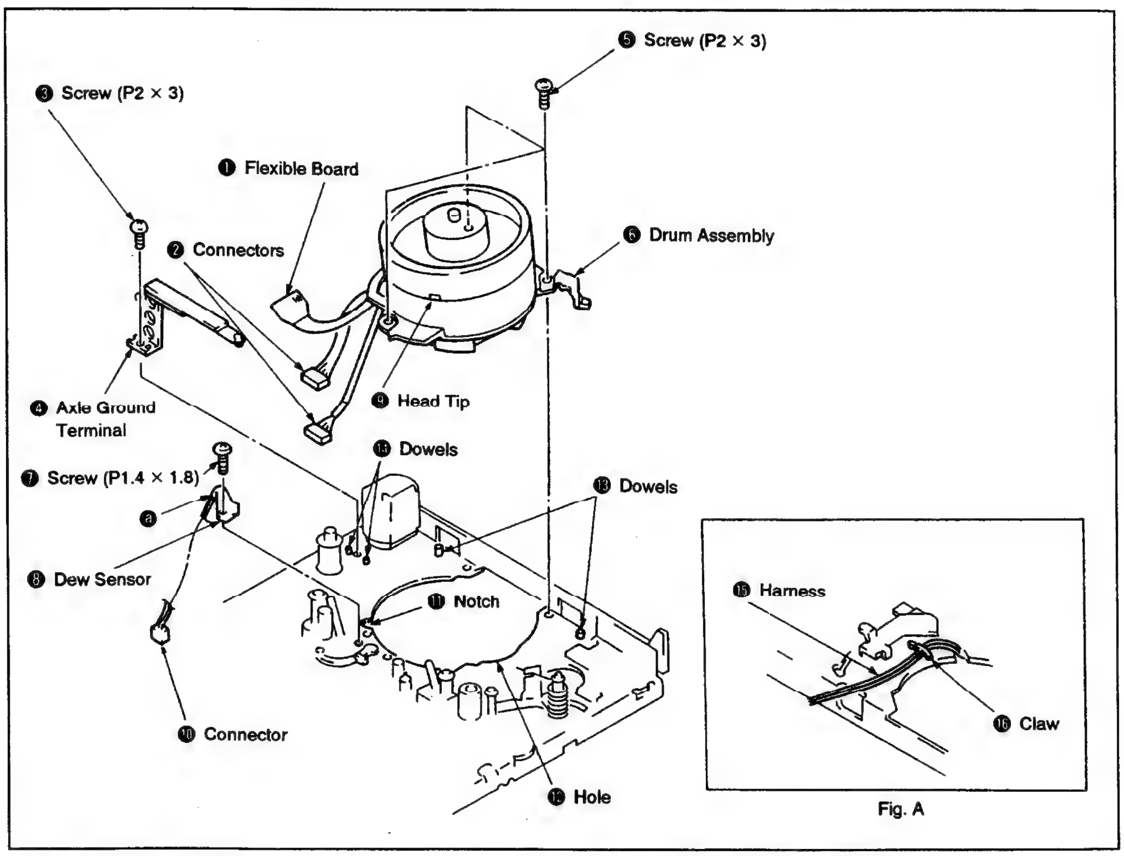


Fig. 3-14.

3-14. EJECT LEVER, SWITCH LEVER ASSEMBLY, PINCH ROLLER SUB ARM ASSEMBLY

1. Removal (See Fig. 3-15.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Set the [STOP] mode.
3) Remove the claw ❶, then remove the eject lever ❷.
4) Remove the stopper washer ❸, then remove the switch lever assembly ❹.
5) Remove the pinch roller load spring ❺.
6) Remove the stopper washer ❻, then remove the pinch roller sub arm assembly ❼.

2. Installation (See Fig. 3-15.)

1) Grease the axle ❽ (See Fig. A).
2) Assemble by inserting ⓐ part of the pinch roller sub arm assembly ❼ into the slot ❾, then insert the pin ❿ into the loading lever assembly notch ⓫.
3) Secure with the stopper washer ❻.
4) Mount the pinch roller load spring ❺ by catching its ⓑ end between the claw ⓬ and the chassis side and its ⓒ end to the claw ⓬.
5) Apply half a drop of oil to the axle ⓭ (See Fig. B).
6) Align the groove ⓮ of the switch lever assembly ❹ with the mode detector switch protrusion ⓯, mount it on the axle ⓭, then insert the pin ⓰ into the drive gear (left) assembly ⓱ outer groove.
7) Secure with the stopper washer ❸.
8) Mount the eject lever ❷ and close the claw ❶.
9) Mount the DC motor (capstan motor) as described in section 3-3.

Note: When mounting the switch lever assembly ❹ onto the axle ⓭ with the tension regulator arm assembly installed, set the pin ⓰ to the arrow Ⓐ side of the switch lever assembly ❹.

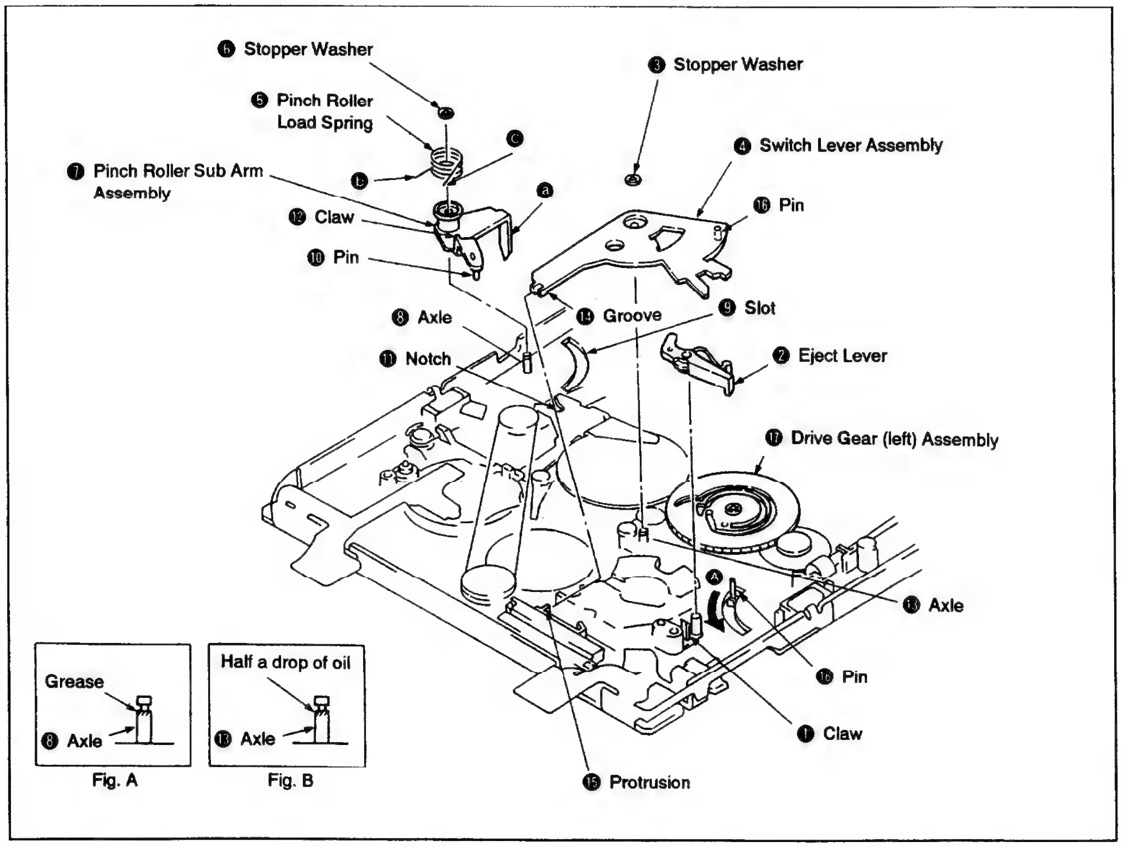


Fig. 3-15.

3-15. TIMING BELT (L) , RC GEAR ASSEMBLY, LOADING LEVER ASSEMBLY, TIMING BELT (S), CONNECTING GEAR ASSEMBLY

1. Removal (See Fig. 3-16.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Remove the pinch roller sub arm assembly as described in section 3-14.
3) Set the STOP mode.
4) Remove the stopper washer ❶ , then remove the RC gear assembly ❷ from the axle ❹ with the timing belt (L) ❸ attached.
5) Remove the timing belt (L) ❸ from the idler pulley assembly ❺.
6) Remove the stopper washer ❻ and remove the loading lever assembly ❽ while pushing the claw ❼ in the direction of the arrow Ⓐ.
7) Turn the stopper ❾ approx. 90 ° in the direction of the arrow Ⓑ.
8) Remove the connecting gear assembly ⓫ from the axle ⓰ with the timing belt (S) ❿ attached.
9) Remove the timing belt (S) ❿ from the idler pulley assembly ❺.

Note: When removing the connecting gear ⓫ , take care not touch the flange section ⓑ.

2. Installation (See Fig. 3-16.)

1) Apply half a drop of oil to the axle ⓰ (See Fig. F).
2) Hook one end of the timing belt (S) ❿ onto the connecting gear assembly ⓫ and the other end onto gear ⓓ of the idler pulley assembly ❺. (Refer to the figure.)
3) Mount the connecting gear assembly ⓫ with the timing belt (S) ❿ attached to the axle ⓰.
4) Turn the stopper ❾ in the direction of the arrow Ⓒ as far as it will go.
5) Apply half a drop of oil to the axle ⓬ (See Fig. A).
6) Fit the loading lever assembly ❽ to the axle ⓬, secure the ⓐ part with the claw ❼ and place the pin ⓭ into the groove of the drive gear (right) assembly ⓮.
7) Install the stopper washer ❻.
8) Place the timing belt (L) ❸ around the gears of the RC gear assembly ❷ indicated in Fig. B, and its opposite side around the gear ⓒ of the idler pulley assembly ❺. (See Fig. E.)
9) Mount the RC gear assembly ❷ onto the axle ❹ with the timing belt (L) ❸ attached, and engage it with the gear of the RK gear assembly ⓯.
10) Install the stopper washer ❶.
11) Grease parts of the loading lever assembly ❽ indicated in Fig. C.
12) Mount the pinch roller sub arm assembly as described in section 3-14.
13) Mount the DC motor (capstan motor) as described in section 3-3.

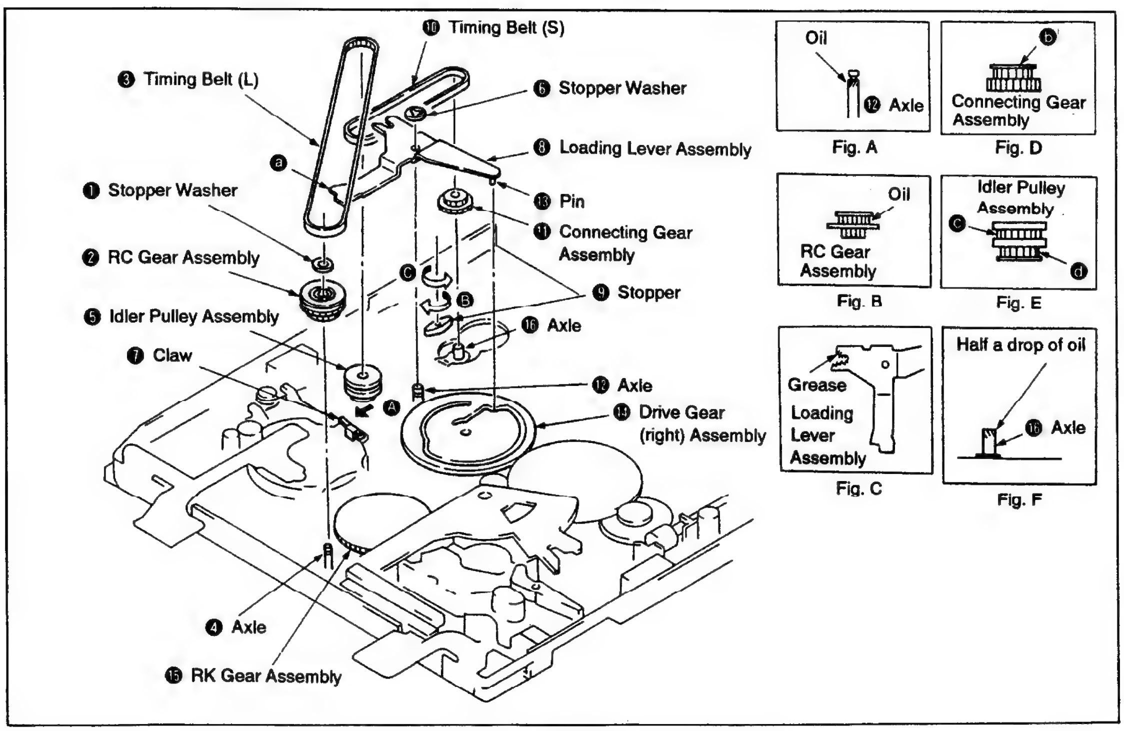


Fig. 3-16.

3-16. IDLER PULLEY, TS BRAKE ASSEMBLY, LB GEAR ASSEMBLY, RK GEAR ASSEMBLY

1. Removal (See Fig. 3-17.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Remove the switch lever assembly as described in section 3-14.
3) Remove the timing belt (L), the RC gear assembly, the loading lever assembly, the timing belt (S) and the connecting gear assembly described in section 3-15.
4) Set the STOP mode.
5) Remove the stopper washer ❶, then remove the idler pulley ❷.
6) Open the claw ❸, then remove the TS brake assembly ❹.
7) Remove the torsion coil spring (LB) ❺.
8) Remove the stopper washer ❻, then remove the LB gear assembly ❼.
9) Remove the RK gear assembly ❽.

Note: When removing the idler pulley ❷, take care not to touch the flange section ⓐ. (See Fig. C.)

2. Installation (See Fig. 3-17.)

1) Apply half a drop of oil to the axle ❾ (See Fig. A).
2) Mount the RK gear assembly ❽ onto the axle ❾, keeping it in horizontal position.
3) Apply half a drop of oil to the axle ❿ (See Fig. B).
4) Mount the LB gear assembly ❼ onto the axle ❿ and secure it with the stopper washer ❻.
5) Insert the torsion coil spring (LB) ❺ into the axle ⓫, then hook it to the mechanism chassis notch ⓬ and to the tab ⓭.
6) Mount the TS brake assembly ❹ and close the claw ❸.
7) Apply half a drop of oil to the axle ⓮ (See Fig. D).
8) Mount the idler pulley ❷ onto the axle ⓮, then secure it with the stopper washer ❶.
9) Mount the timing belt (L), the RC gear assembly, the loading lever assembly, the timing belt (S) and the connecting gear assembly as described in section 3-15.
10) Mount the switch lever assembly as described in section 3-14.
11) Mount the DC motor (capstan motor) as described in section 3-3.

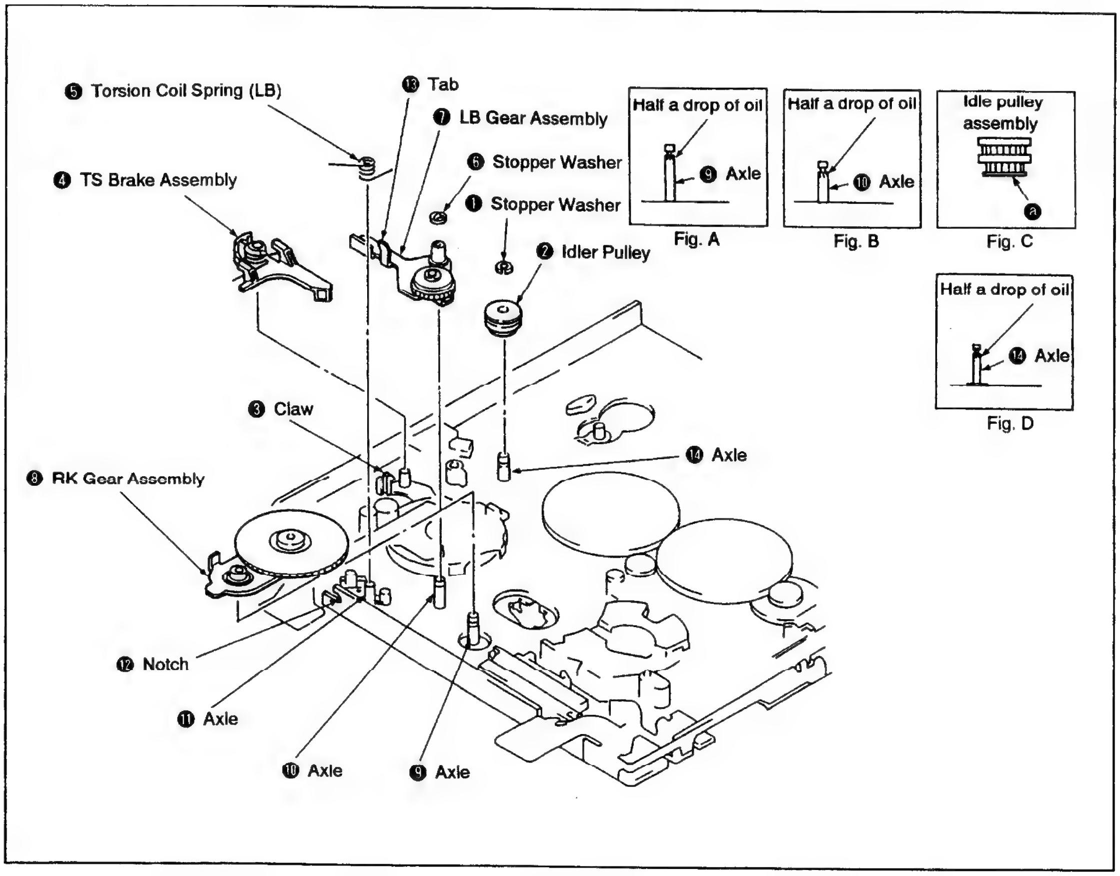


Fig. 3-17.

3-17. UL GEAR, UL BRAKE, UL ARM, LB PLATE SPRING

1. Removal (See Fig. 3-18.)

1) Remove the switch lever assembly as described in section 3-14.
2) Remove the stopper washer ❶, then remove the UL gear ❷.
3) Remove the UL arm ❸, the 1.6 mm-diameter poly washer ❹ and the LB plate spring ❺.
4) Remove the UL brake ❻.

2. Installation (See Fig. 3-18.)

1) Mount the UL brake ❻.
2) Apply half a drop of oil to the axle ❼ (See Fig. A).
3) Mount the LB plate spring ❺ to the axle ❼ as shown in Fig. B, then install the 1.6mm-diameter poly washer ❹.
4) Mount the UL arm ❸ to the axle ❼ so that the protrusion ❽ comes into the groove ❾ of the UL brake ❻.
5) Mount the UL gear ❷ to the axle ❼ and engage it with the gear of the drive gear (left) assembly ❿.
6) Install the stopper washer ❶.
7) Mount the switch lever assembly as described in section 3-14.

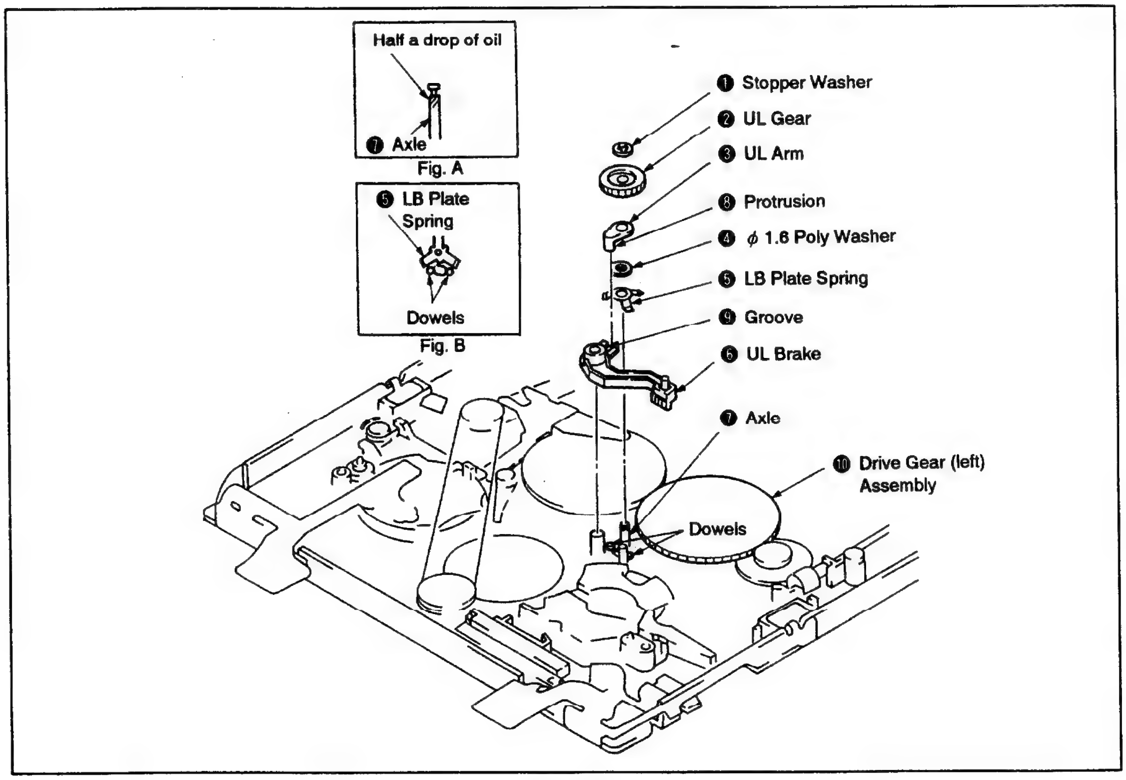


Fig. 3-18.

3-18. COASTER (RIGHT) ASSEMBLY, DRIVE GEAR (RIGHT) ASSEMBLY

1. Removal (See Fig. 3-19.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Remove the drum unit as described in section 3-13.
3) Remove the switch lever assembly as described in section 3-14.
4) Remove the timing belt (L) , the RC gear assembly and the loading lever assembly as described in section 3-15.
5) Set the [STOP] mode.
6) Remove the screw ❶ , then remove the coaster plate spring ❷ and the coaster (right) assembly ❸ .
7) Remove the two screws ❹ , then remove the reinforcing plate TT ❺ .
8) Remove the stopper washer 1.5 ❻ , then remove the drive gear (right) assembly ❼ .

2. Installation (See Fig. 3-19.)

1) Grease the points of the mechanism chassis shown in Fig A.
2) Apply half a drop of oil to the axle ❽ (See Fig. F).
3) Grease pin ❾ , axle ❿ and dowel ⓮ of the coaster (right) assembly ❸ (See Fig. D).
4) Mount by aligning the pin ❾ and the axle ❿ with the slot ⓫ of the mechanism chassis.
5) Move the brake release arm ⓬ in the direction of the arrow Ⓐ to put it out of the way.
6) Mount the drive gear (right) assembly ❼ to the axle ❽ , and engage it with the drive gear (left) assembly ⓭ as shown in Fig. B.
7) Align the ⓐ part with the ⓑ part, and the hole ⓮ with the pin ❾ of the coaster (right) assembly ❸ .
8) Install the stopper washer 1.5 ❻ .
9) Mount by aligning the coaster plate spring ❷ with the axle ❿ of the coaster (right) assembly ❸ and pin ❾ , then secure with the screw ❶ .
10) Mount the reinforcing plate TT ❺ aligning it with the dowel ⓯ , then tighten the two screws ❹ in the indicated order.
11) Grease the points indicated in Figs. C and E.
12) Mount the timing belt (L) , the RC gear assembly and the loading lever assembly as described in section 3-15.
13) Mount the switch lever assembly as described in section 3-14.
14) Mount the drum unit as described in section 3-13.
15) Mount the DC motor (capstan motor) as described in section 3-3.

Note:
- Screw ❶ should be tightened with a tightening torque of approx. 500g•cm. If tightened too much, the coaster (right) assembly ❸ and the coaster plate spring ❷ will be deformed.
- After installing, be sure to perform tape path adjustment as described in section 4.

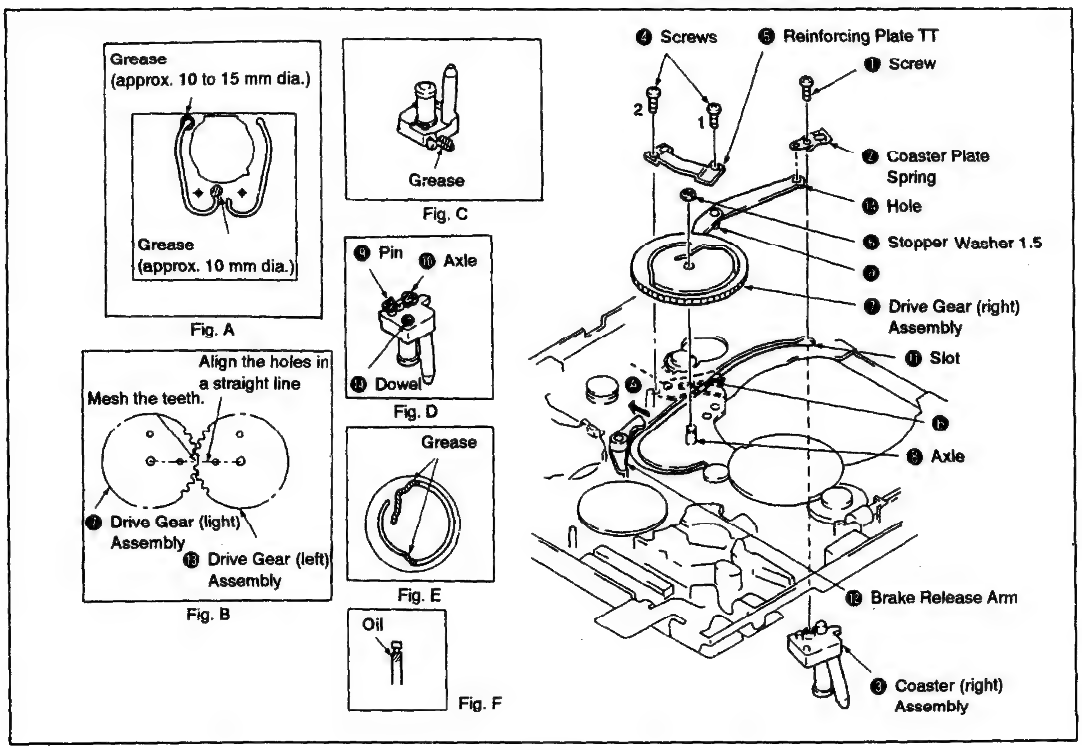


Fig. 3-19.

3-19. COASTER (LEFT) ASSEMBLY, DRIVE GEAR (LEFT) ASSEMBLY

1. Removal (See Fig. 3-20.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Remove the drum assembly as described in section 3-13.
3) Remove the switch lever assembly and the pinch roller sub-arm assembly as described in section 3-14.
4) Remove the timing belt (L), the RC gear assembly and the loading lever assembly as described in section 3-15.
5) Remove the coaster (right) assembly and the drive gear (right)assembly as described in section 3-18.
6) Remove the screw ❶, then remove the coaster plate spring ❷ and the coaster (left) assembly ❸.
7) Remove the two screws ❹, then remove the reinforcing plate SS assembly ❺.
8) Remove the stopper washer 1.5 ❻, then remove the drive gear (left) assembly ❼.

2. Installation (See Fig. 3-20.)

1) Grease the points of the mechanism chassis shown in Fig A.
2) Apply half a drop of oil to the axle ❽ (See Fig. E).
3) Grease pin ❾, axle ❿ and dowel ⓯ of the coaster (left) assembly ❸ (See Fig. B).
4) Mount by aligning the pin ❾ and the axle ❿ with the slot ⓫ of the mechanism chassis.
5) Fit the drive gear (left) assembly ❼ to the axle ❽, and mount so that the gear engages with the wheel gear ⓬ and the UL gear ⓭.
6) Align the ⓐ part with the slot ⓫, and the hole ⓮ with the pin ❾ of the coaster (left) assembly ❸.
7) Install the stopper washer 1.5 ❻.
8) Mount by aligning the coaster plate spring ❷ with the axle ❿ and pin ❾ of the coaster (left) assembly ❸, then secure with the screw ❶.
9) Mount the reinforcing plate SS assembly ❺ aligning it with the dowel ⓯, then tighten the two screws ❹ in the indicated order.
10) Grease points indicated in Figs. C and D.
11) Mount the coaster (right) assembly and the drive gear (right)assembly as described in section 3-18.
12) Mount the timing belt (L), the RC gear assembly and the loading lever assembly as described in section 3-15.
13) Mount the switch lever assembly and the pinch roller sub arm assembly as described in section 3-14.
14) Mount the drum assembly as described in section 3-13.
15) Mount the DC motor (capstan motor) as described in section 3-3.

Note:
- Screw ❶ should be tightened with a tightening torque of approx. 500g•cm. If tightened too much, the coaster (right) assembly ❸ and the coaster plate spring ❷ will be deformed.
- After installing, be sure to perform tape path adjustment as described in section 4.

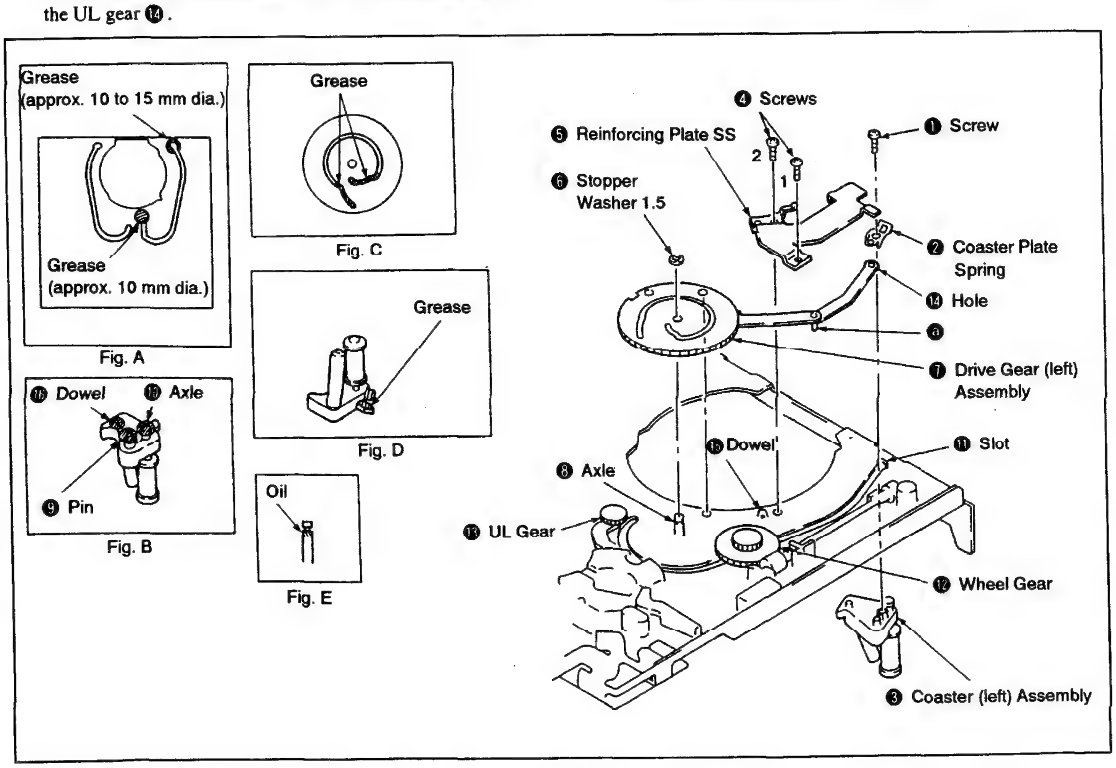


Fig. 3-20.

3-20. LOADING MOTOR, BRAKE RELEASE ARM, WHEEL GEAR, WORM ASSEMBLY

1. Removal (See Fig. 3-21.)

1) Remove the DC motor (capstan motor) as described in section 3-3.
2) Remove the switch lever assembly and the pinch roller sub arm assembly as described in section 3-14.
3) Remove the timing belt (L), the RC gear assembly and the loading lever assembly as described in section 3-15.
4) Remove the drive gear (right) assembly as described in section 3-18.
5) Remove the drive gear (left) assembly as described in section 3-19.
6) Remove the two screws ❶, then remove the loading motor assembly ❷.
7) Remove the brake release arm ❸.
8) Remove the stopper washer ❹, then remove the wheel gear ❺.
9) Remove the worm assembly ❻ from the six claws ❼.

2. Installation (See Fig. 3-21.)

1) Mount the worm assembly ❻, matching it to the six claws ❼.
2) Grease the shaded parts of the worm assembly ❻ (five places) (see Fig A).
3) Apply half a drop of oil to the axle ❽ (See Fig. B).
4) Fit the wheel gear ❺ to the axle ❽ and engage it with the gear of the worm assembly ❻.
5) Mount the brake release arm ❸.
6) Grease the whole perimeter of the gear of the loading motor assembly ❷.
7) Align the loading motor assembly ❷ with the mechanism chassis and secure it with the two screws ❷.
8) Mount the drive gear (left) assembly as described in section 3-19.
9) Mount the drive gear (right) assembly as described in section 3-18.
10) Mount the timing belt (L), the RC gear assembly and the loading lever assembly as described in section 3-15.
11) Mount the switch lever assembly and the pinch roller sub arm assembly as described in section 3-14.
12) Mount the DC motor (capstan motor) as described in section 3-3.

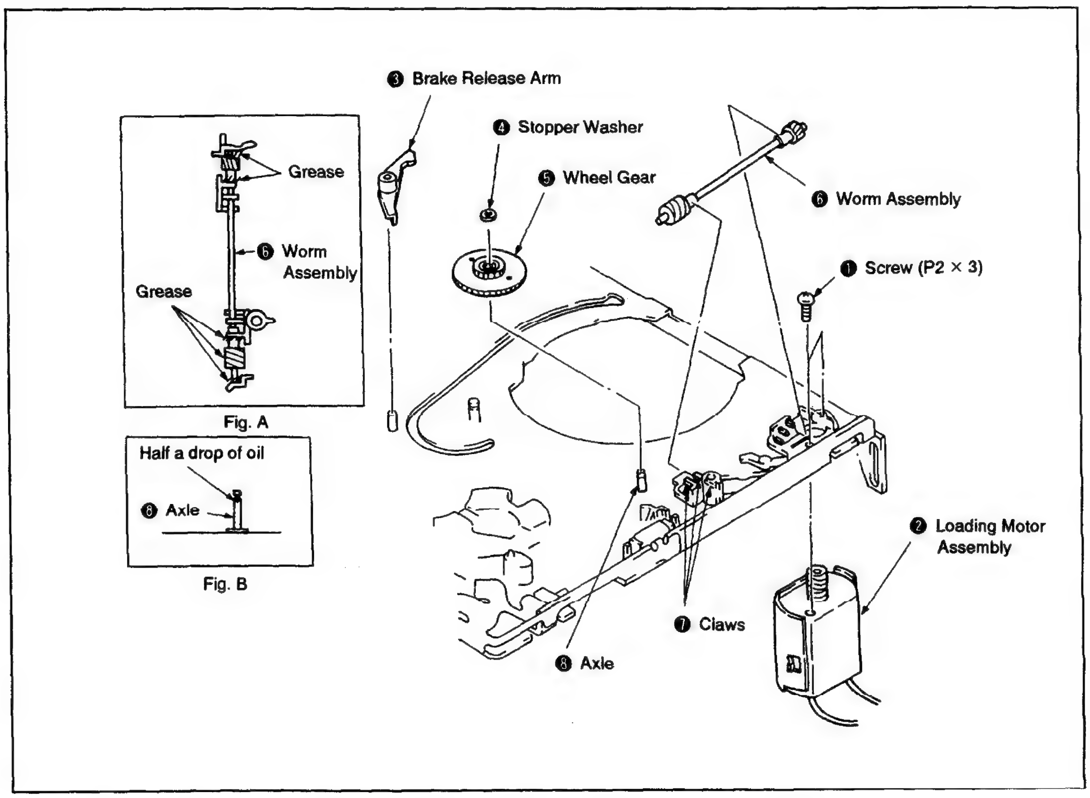


Fig. 3-21.

3-21. ROTARY UPPER DRUM REPLACEMENT

1. Removal

- If possible, make a recording before removal.

1) Detach the six solderings ⓐ, then use a pair of tweezers or the like to confirm that the terminals passing through the board holes from below can move freely.
2) Remove the two screws ❶ (See Fig. 3-22).
3) Mount the jig ❹ (Ref. No. J-7) with the two supplied screws ❷, then screw the attached hexagon socket screws ❸ to the jig ❹. The rotary upper drum ❺ will move upward and come off (See Fig. 3-23).

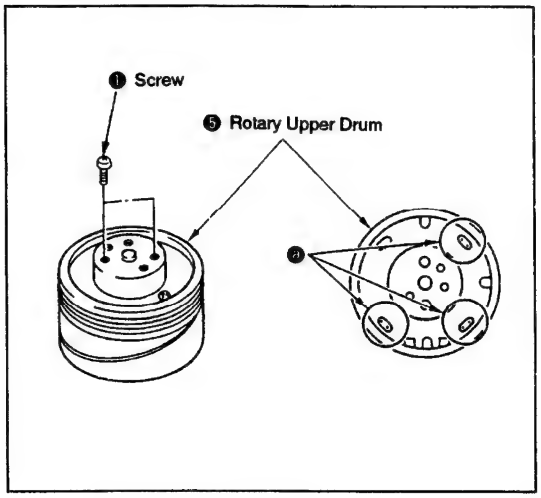


Fig. 3-22.

2. Installation

1) Wipe clean the flange surface and the rotary upper drum ❺ surface that makes contact with it, and confirm that they are free from dirt and scratches.
2) Insert the jig ❼ (Ref. No. J-7) into the drum positioning hole, then set the rotary upper drum ❺ by passing the jig through its positioning hole ❻.
   Note: Confirm that the terminals ❽ protrude slightly from the rotary upper drum board holes (See Fig. 3-24).
3) Remove the jig ❼ and push down the rotary upper drum ❺ gently by hand. If it does not go all the way down, secure it temporarily by tightening the two hexagon socket screws ❶ alternately.
4) Insert the jig ❼ into the positioning hole ❻ again and confirm that it goes in smoothly. If it does not, loosen the two screws ❶, repeat step 3 of the Removal paragraph and restart the setting procedure.
5) Tighten the screws ❶.
6) Solder the terminals ❽ (ⓐ in Fig. 3-22).
   Note: Take care that no solder flows below the board.

Note: After installing, be sure to perform tape path adjustment as described in section 4.

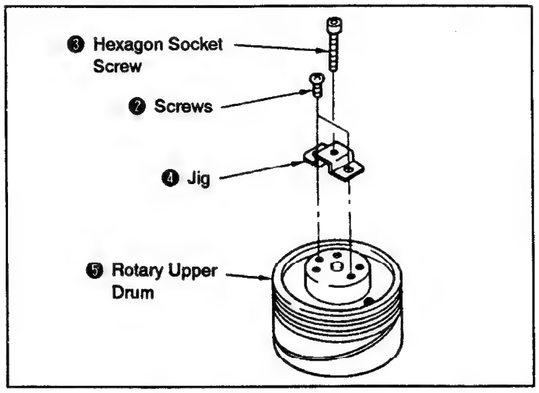


Fig. 3-23.

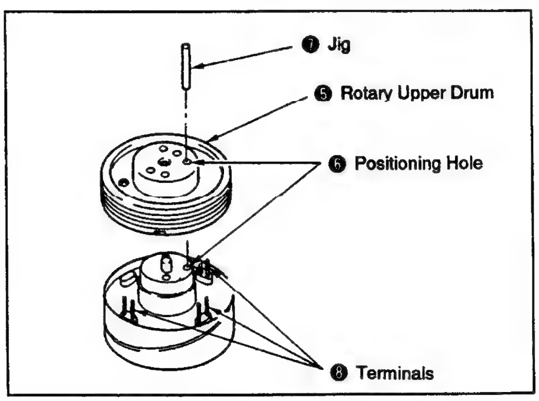


Fig. 3-24.

3-22. FWD BACK TENSION (See Fig. 3-25.)

1) Set the torque cassette (Ref. No. J-6).
2) Set the FWD mode and confirm that S reel table torque value is within 9 to 13 g•cm.
3) If the torque value does not meet the specification, adjust the adjust arm ❶.

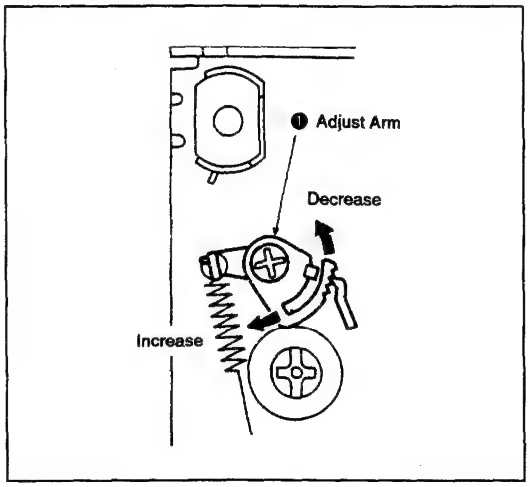


Fig. 3-25.

3-23. REEL TORQUE CHECK

1) Set the torque cassette.
2) Set the FWD mode and confirm that T reel table torque value is within 7 to 15 g•cm.
3) Set the REV mode and confirm that S reel table torque value is within 29 ± 6 g•cm.
4) Set the REV mode and confirm that T reel table torque value is within 13 to 25 g•cm.
5) If a torque value does not meet the specifications above, replace the corresponding reel table.

4. TAPE PATH ADJUSTMENT

[The Track Shift Mode]

In the 8 mm video system, instantaneous tape speed control is performed using four kinds of pilot signals, and high-precision tracking is achieved through the ATF (Automatic Track Finding) system. This makes a tracking control knob unnecessary and allows for precise tracing.

On the other hand, however, tape path adjustment presents some difficulties when the ATF system is used. Namely, since the ATF system will automatically compensate to some degree for head tracing errors, thorough adjustment is not possible.

This can be solved by setting the track shift mode for tracking fine adjustment. ATF will be compulsorily activated, shifting the tracking amount by a fixed amount (approx. 1/4) and thus making tracking fine adjustment easy. Furthermore, no track shift jigs are required.

4-1. TRACK SHIFT MODE SETTING

[Setting Procedure]

- Connect the TEST A and TEST B terminals to the COM terminal.

  Example:

  NTSC ········ GV-8

  PAL ·········· GV-8E

  Connect Pins ① and pin ③ of CN017 on the { SV-34 board (GV-8) / SV-35 board (GV-8E) } to pin ② of it. (See Fig. 4-1)

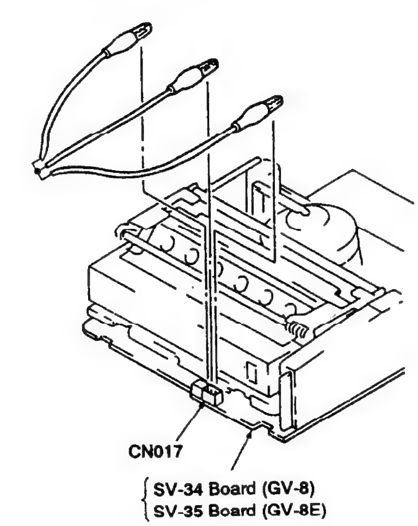
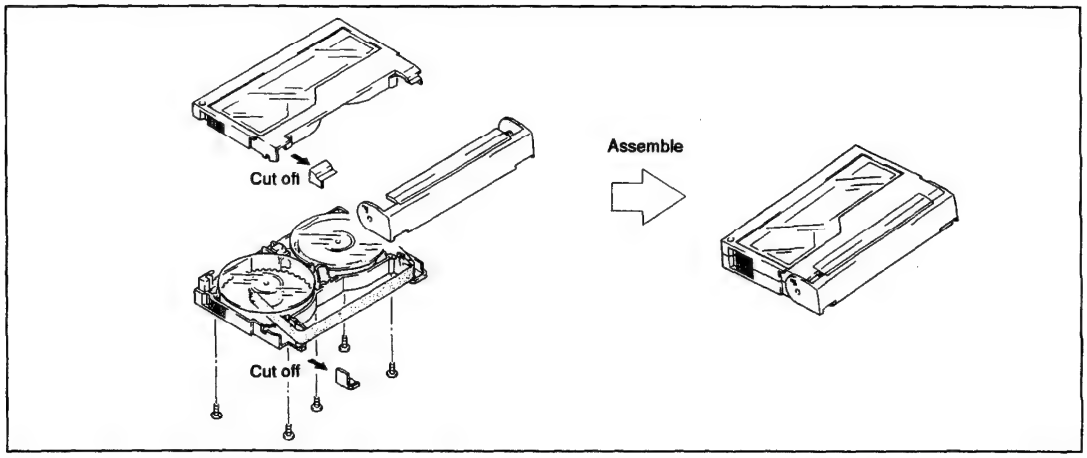


Fig. 4-1.

[Note on Adjustment of No.7 Guide (TG-7)]

The height adjustment screw for No.7 guide (TG-7) is located at some distance from the guide (refer to Fig. 4-2).
Therefore, when performing section 4-6. No.7 Guide (TG-7) Adjustment it is convenient to use the alignment tape for tracking (Ref. No. J-5), modified as follows, and perform adjustment in playback mode.



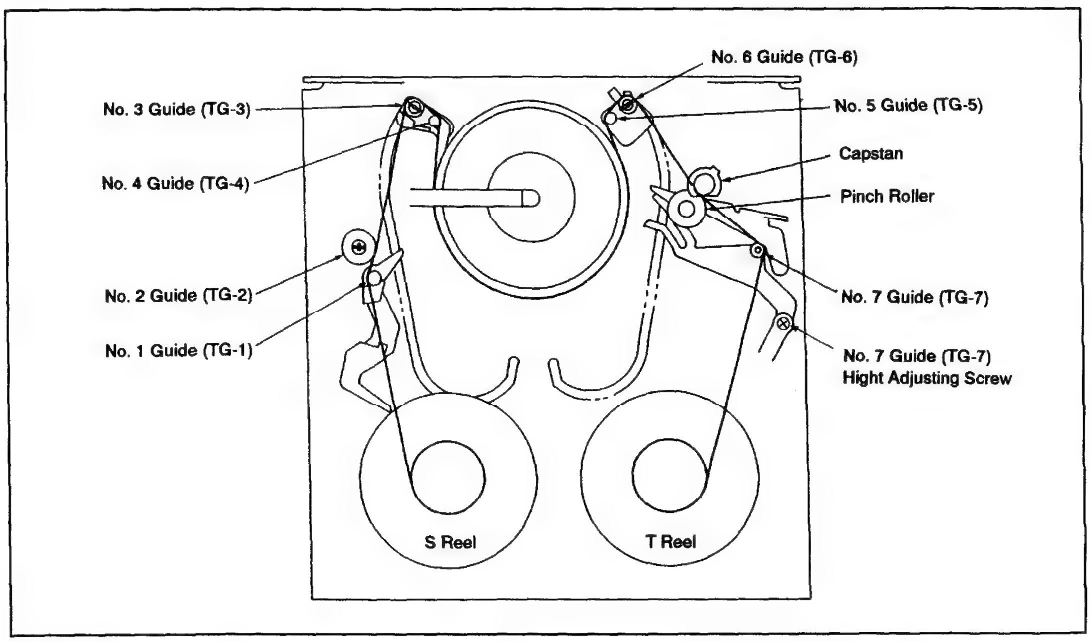


Fig. 4-2.

4-2. PREPARATIONS FOR ADJUSTMENT

1) Clean tape path surfaces (tape guides, drum, capstan shaft, pinch roller) (See Fig. 4-2).
2) Connection of oscilloscope and output method of waveform.
   CH 1: RF signal output of the drum head (V RF OUT)
   Method for signal output:
   Short-circuit the external trigger output (RF SW. P) and GND.

   Example:
   NTSC ····· GV-8
   PAL ······· GV-8E
   CH 1: Pin ③ (V RF OUT) of CN018 on the
   { SV-34 board (GV-8)
   { SV-35 board (GV-8E)
   Method for signal output:
   Short-circuit pin ① (GND) and pin ② (RF SW.P) of CN018 on the
   { SV-34 board (GV-8)
   { SV-35 board (GV-8E)
3) Play back the alignment tape for tracking adjustment (Ref. No. J-5).
4) Confirm that both the entrance and exit side RF waveforms of the oscilloscope are flat (See Fig. 4-4). If they are not, adjust as follows.

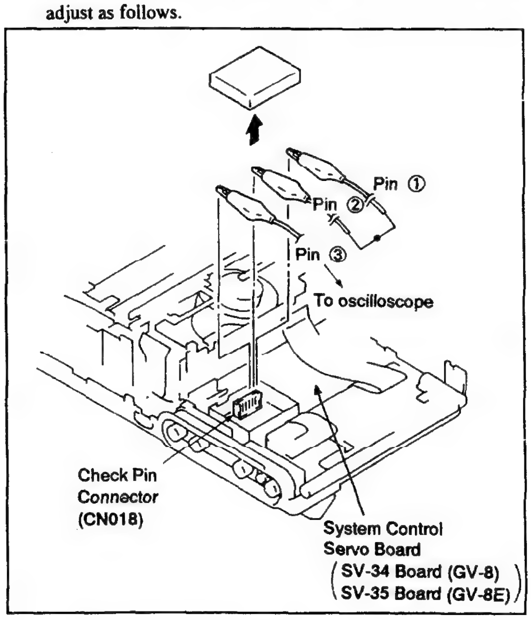


Fig. 4-3.

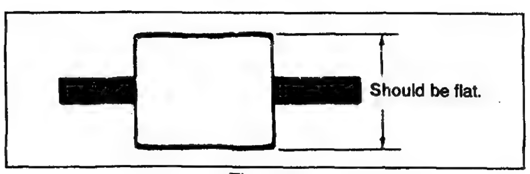


Fig. 4-4.

4-3. TRACKING ADJUSTMENT (See Fig. 4-5.)

1) Play back the alignment tape for tracking adjustment.
2) Pass a hexagonal wrench, screwdriver (Ref. No. J-11) or the like through the hole ❶, loosen the lockscrew ❷ a little, then make the entrance side waveform flat by turning the No. 3 guide (TG-3) ❸.
3) Pass a hexagonal wrench, screwdriver or the like through the hole ❹, loosen the lockscrew ❺ a little, then make the exit side waveform flat by turning the No. 6 guide (TG-6) ❻.

Note: Take care not to loosen lockscrews too much, since guides come loose easily.

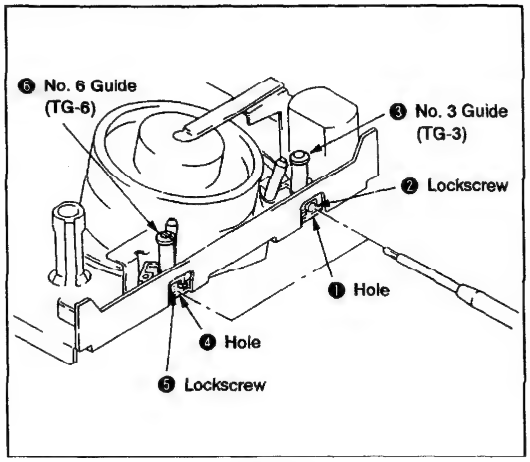


Fig. 4-5.

4-4. TRACKING FINE ADJUSTMENT (See Figs. 4-5. and 4-6.)

1) Play back the alignment tape for tracking adjustment and set the track shift mode.
2) Confirm whether the waveform is flat. If it is not, turn the No. 3 (TG-3) and No. 6 (TG-6) guides so that it becomes flat.
3) Fix the No. 3 guide ❸ by tightening its lockscrew ❷. Then confirm that the entrance side waveform has not changed.
4) Fix the No. 6 guide ❻ by tightening its lockscrew ❺. Then confirm that the exit side waveform has not changed.

Note: The set screws ❷ and ❺ should be tightened with a tightening torgue of approx. 200g•cm ± 10%.
If tightened too much, there is danger of damaging the thread.

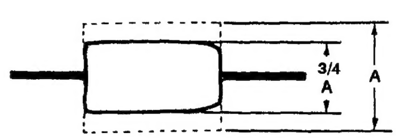


Fig. 4-6.

4-5. No. 2 GUIDE (TG-2) ADJUSTMENT

When the No. 2 guide has been turned or replaced, perform height presetting before this adjustment.

4-5-1. No. 2 Guide (TG-2) Height Presetting (See Fig. 4-7.)

1) Adjust the height from the mechanism chassis upper surface to the TG-2 upper flange ❶ upper surface to 18.6 mm by rotating the TG-2 upper flange ❶.

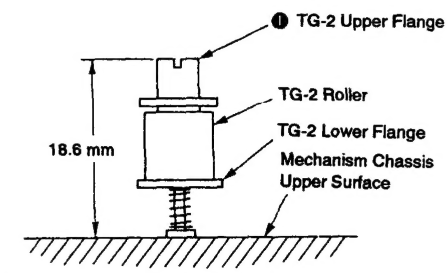


Fig. 4-7.

[Reference]
This U mechanism is equipped with four adjustable guides (TG-2, 3, 6 and 7). To raise or lower the respective guide rotate the corresponding adjustment screw as shown below.

Guide	Guide adjustment	Rotating direction of adjustment screw
TG-2, 3, 6	Raise	Counterclockwise
	Lower	Clockwise
TG-7	Raise	Counterclockwise
	Lower	Clockwise

4-5-2. No. 2 Guide (TG-2) Adjustment (See Figs. 4-8. and 4-9.)

1) Play back a thin tape like the P6-120MP, etc. and set the REV mode.
2) Confirm that the tape is not bent at the lower flange ➋ of the No. 2 guide (TG-2) ➊ (See Fig. 4-8). If it is, turn the upper flange ➌ of the No. 2 guide (TG-2) ➊ clockwise with a screwdriver, lowering it until the tape is straightened.
3) Play back the alignment tape for tracking adjustment.
4) Perform tracking adjustment and tracking fine adjustment as described in sections 4-3. and 4-4.
5) In the track shift mode, CUE/REV the tape, then play it back and confirm that the RF waveform rises flat within 2 seconds.
6) If the waveform is not normal (See Fig. 4-9), turn the upper flange ➌ of the No. 2 guide (TG-2) ➊ 90° counter-clockwise and repeat step 5.
   Repeat steps 5 and 6 until a normal waveform is obtained. Then, confirm that the tracking waveform has not changed. If it has, perform fine adjustment of entrance side tracking and repeat step 5.

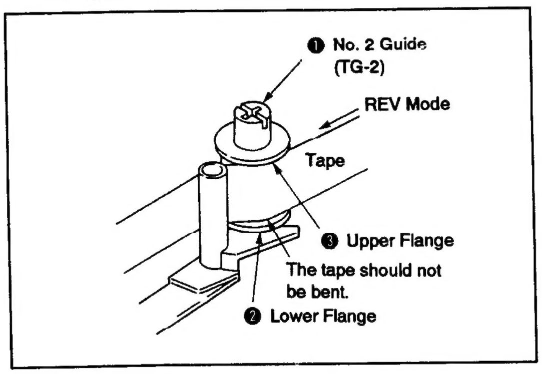


Fig. 4-8.

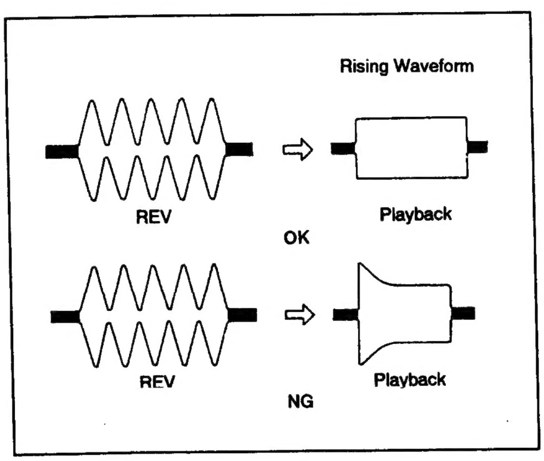


Fig. 4-9.

4-6. No. 7 GUIDE (TG-7) ADJUSTMENT (See Fig. 4-10.)

1) Play back the alignment tape for tracking adjustment and set the REV mode.
2) Confirm that the tape is not bent between the No. 6 guide (TG-6) ➊ and the capstan ➋. If it is, turn the hight adjusting screw ➍ of the No. 7 guide (TG-7) ➌ until the tape is straightened.
3) Set the playback mode again and confirm that the tape is not bent between the capstan ➋ and the hight adjusting screw ➍ of the No. 7 guide (specification:0.5 mm or less). If the tape is bent beyond the specification, turn the No. 7 guide (TG-7) ➌ until bending is within the specification (0.5 mm).
   If in the REV mode tape bending between the No. 6 guide (TG-6) ➊ and the capstan ➋ is 0.3 mm or less, adjustment can be considered completed.

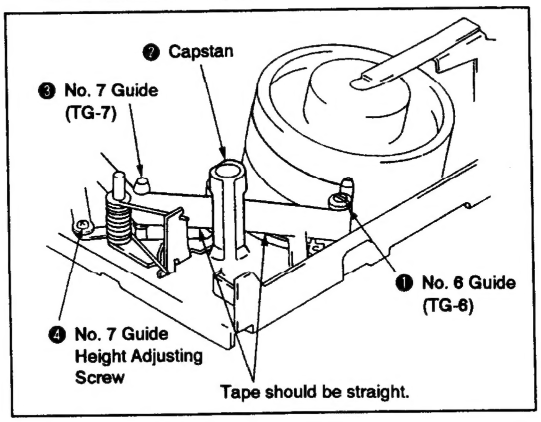


Fig. 4-10.

4-7. CUE AND REV WAVEFORM CHECK (See Fig. 4-11.)

1) Play back the alignment tape for tracking adjustment and set the REV mode. Confirm that waveform peaks maintain a constant pitch of 5 seconds or more (See Fig. 4-11). In case pitch is not constant, perform section 4-4. Tracking Fine Adjustment and section 4-6. No. 7 Guide Adjustment.
2) Set the CUE mode. Confirm that waveform peaks still maintain a constant pitch of 5 seconds or more (See Fig. 4-11). Otherwise, perform section 4-4. Tracking Fine Adjustment.

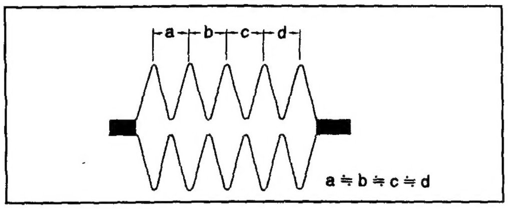


Fig. 4-11.

4-8. CHECK AFTER ADJUSTMENT

4-8-1. Tracking Check

1) Confirm that the amplitude of RF waveform is reduced to approx. 3/4 when the track shift mode is set (See Fig. 4-12).
2) Then, confirm that the minimum amplitude value (E_{MIN}) is 65% of the maximum value (E_{MAX}) or larger (See Fig. 4-13).
3) Confirm that no large fluctuations occur on the waveform (See Fig. 4-14).

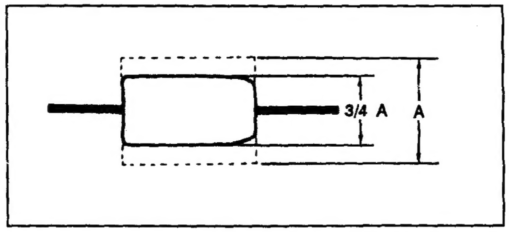


Fig. 4-12.

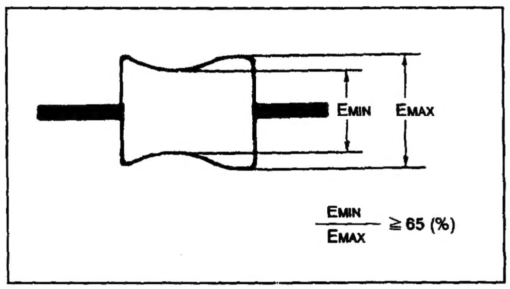


Fig. 4-13.

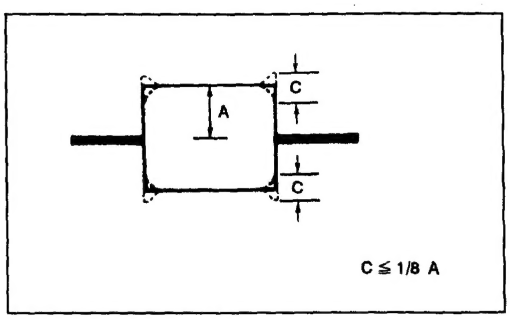


Fig. 4-14.

4-8-2. Rising Check (See Fig. 4-15.)

1) Play back the alignment tape for tracking adjustment.
2) Cancel the track shift mode.
3) Eject the tape, then load it again.
4) Set the playback mode and confirm that the RF waveform rises flat within 2 seconds. Also confirm that the tape is not bent around the pinch roller (See Fig. 4-15).
5) CUE/REV and FF/REW the tape, then play it back and confirm that the RF waveform rises flat within 2 seconds. Also confirm that the tape is not bent around the pinch roller.
6) Repeat steps 3) to 5) once more.

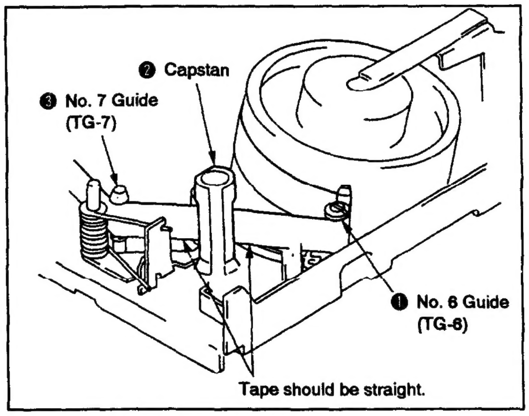


Fig. 4-15.

4-8-3. Tape Path Check (See Fig. 4-16.)

1) Play back a thin tape like the P6-120MP (NTSC) or P5-90MP (PAL), etc. and confirm that no tape rising occurs, and that curling is less than 0.3 mm, at the lower flange of the No. 2 guide, the upper flange of the No. 3 guide, the upper flange of the No. 6 guide and the No. 7 guide upper and lower flanges.
2) Confirm that no tape rising occurs and that curling is less than 0.3 mm at the flanges of all guide when pressing the FF button in the playback mode to set the CUE mode, or the REW button to set the REV mode.

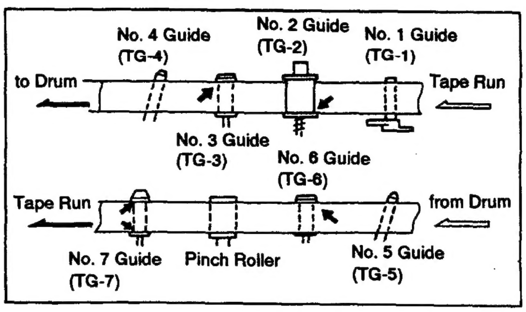


Fig. 4-16.